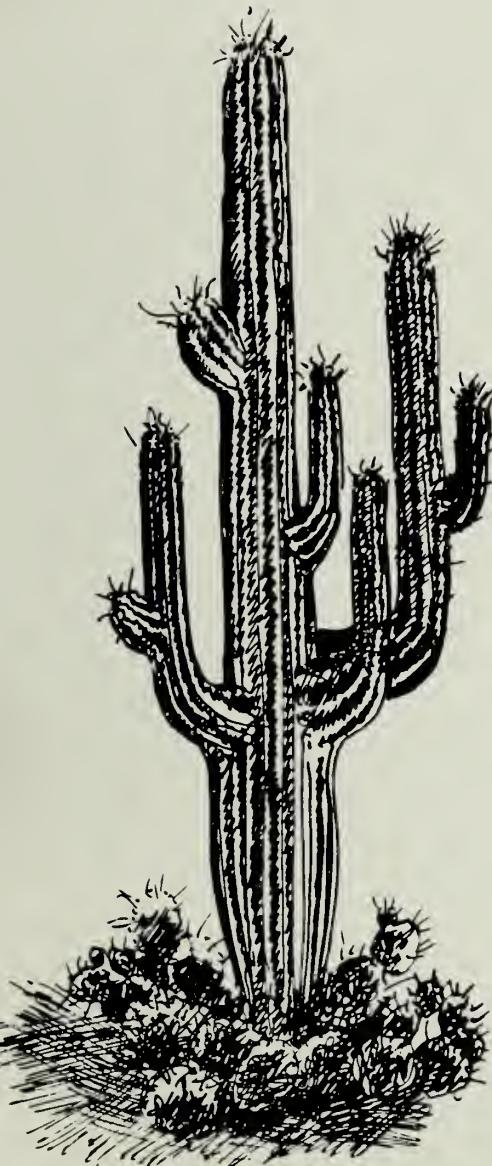


Sherron OPI

D-52



# Cooperative National Park Resources Studies Unit

## ARIZONA

TECHNICAL REPORT NO. 26

A History of the Quitobaquito Resource  
Management Area, Organ Pipe Cactus  
National Monument, Arizona

by Peter S. Bennett and Michael R. Kunzmann

University of Arizona  
Tucson, Arizona 85721

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University of Arizona/Tucson - National Park Service

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D-52

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SCHOOL OF RENEWABLE NATURAL RESOURCES  
UNIVERSITY OF ARIZONA  
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# A HISTORY OF THE QUITOBAQUITO RESOURCE MANAGEMENT AREA

Organ Pipe Cactus National Monument,  
Arizona

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Figure 1. Jim Orosco, the last resident, stands near his Quitobaquito home in 1954. He holds a long strip of rawhide which he is cutting and thinning with the aid of the tool stuck into the post, shown to the left, in preparation for making a lariat. Jim's grandfather, Louis, settled here between 1885 and 1889 and Jim and his father, Jose Juan lived here most of their lives. The Orosco family's claim to the land at Quitobaquito was extinguished by the National Park Service in 1957 for \$13,000. [Photo by Ida Smith - ORPI files].



## TABLE OF CONTENTS

	<u>Page</u>
LIST OF FIGURES . . . . .	iv
LIST OF PLATES . . . . .	vii
ACKNOWLEDGEMENT . . . . .	viii
INTRODUCTION . . . . .	1
QUITOBAQUITO'S HISTORIC BACKGROUND . . . . .	1
The Indian Period . . . . .	1
The Spanish Colonial Period, Kino and Garces . . . . .	3
Mexican Period -- Revolution and Independence . . . . .	13
The United States and Arizona's Territorial Period . . . . .	14
Quitobaquito - The Entrepreneurial Period . . . . .	15
The Orosco Family - the Longest Resident Family . . . . .	18
Modern Explorers . . . . .	19
Cattle Ranching and the Gray Brothers . . . . .	23
The Park Service Era . . . . .	24
The Resources of Quitobaquito . . . . .	35
DISCUSSION . . . . .	40
CONCLUSIONS . . . . .	68
LITERATURE CITED . . . . .	72
APPENDIX . . . . .	77

## LIST OF FIGURES

	<u>Page</u>
Figure 1. Jim Orosco, the last resident, stands near his Quitobaquito home in 1954 . . . . .	i
Figure 2. Julian Martinez statue of Eusebio Kino in Tucson, Arizona . . . . .	7
Figure 3a. Quitobaquito area looking southeast from Sestier's grave on December 8, 1950 . . . .	21
Figure 3b. Quitobaquito area looking southeast from Sestier's grave on December 11, 1988 . . . .	22
Figure 4a. Quitobaquito Pond looking toward the east on October 1956 . . . . .	25
Figure 4b. Quitobaquito Pond looking toward the east on December 11, 1988 . . . . .	26
Figure 5a. Easternmost of two overlapping views of Quitobaquito Pond looking towards the south in May 1939 . . . . .	27
Figure 5b. Easternmost of two overlapping views of Quitobaquito Pond looking towards the south in December 1988 . . . . .	28
Figure 6a. Westermost of two overlapping views of Quitobaquito Pond looking towards the south in May 1939 . . . . .	29
Figure 6b. Westermost of two overlapping views of Quitobaquito Pond looking towards the south on December 11, 1988 . . . . .	30
Figure 7a. View to the southwest looking towards Quitobaquito Pond in November 1957 . . . .	33
Figure 7b. View to the southwest looking towards Quitobaquito Pond in December 1988 . . . .	34
Figure 8. View Quitobaquito Pond taken from dam in 1953 . . . . .	38
Figure 9a. Southeast spring condition on February 23, 1961 . . . . .	41
Figure 9b. Southeast spring condition on December 11, 1988 . . . . .	42

## LIST OF FIGURES (CONTINUES)

	<u>Page</u>
Figure 10a. View looking southwest from the southeast spring on August 23, 1963 . . . . .	43
Figure 10b. View looking southwest from the southeast spring on December 11, 1988 . . . . .	44
Figure 11a. View of the pond vegetation from the north shore of Quitobaquito Pond on December 9, 1960 . . . . .	45
Figure 11b. View of the pond vegetation from the north shore of Quitobaquito Pond on April 19, 1956 . . . . .	46
Figure 12a. View of Quitobaquito Pond looking toward the southwest on February 16, 1957 . . . . .	47
Figure 12b. View of Quitobaquito Pond looking toward the southwest on December 11, 1988 . . . . .	48
Figure 13a. View of Quitobaquito Pond looking east-southeast on February 16, 1957 . . . . .	49
Figure 13b. View of Quitobaquito Pond looking east-southeast on December 11, 1988 . . . . .	50
Figure 14a. View of Quitobaquito Pond looking toward the west in August 1957 . . . . .	51
Figure 14b. View of Quitobaquito Pond looking toward the west on December 11, 1988 . . . . .	52
Figure 15a. National Park Service drained the Pond and began excavation in late 1961 . . . . .	53
Figure 15b. Shows excavated soil being loaded into a dump truck for removal in late 1961 . . . . .	54
Figure 16a. View of the large cottonwood growing on the Quitobaquito dam in late 1961 . . . . .	55
Figure 16b. View of the wooden prop holding up the large cottonwood tree on Quitobaquito dam in 1965 . . . . .	56

## LIST OF FIGURES (CONTINUES)

	<u>Page</u>
Figure 17a. The old cottonwood tree several years prior to the 1961 pond excavation . . . . .	57
Figure 17b. The old cottonwood tree in April 28, 1966 after digging down the pond bottom . . . . .	58
Figure 18a. Aerial view of the pond and 1962 visitor parking lot at Quitobaquito Pond in April 1968 . . . . .	59
Figure 18b. The parking lot was abandoned and attempts at revegetation were begun in 1974. This photo was taken on December 11, 1988 . . . . .	60
Figure 19a. December 8, 1969 photo shows a portable pump which began drafting from Quitobaquito Pond and dumping into old acequias . . . . .	61
Figure 19b. This December 11, 1988 photograph shows the old acequias and surrounding area . . . . .	62
Figure 20a. As the Pond was drained, a number desert pupfish were seined from its receding waters on December 9, 1969 . . . . .	63
Figure 20b. Quitobaquito Pond has been completely pumped out in this December 9, 1969 photograph . . . . .	64
Figure 21a. December 9, 1950 view of Aguajita Wash, the largest drainage adjacent to Quitobaquito . . . . .	65
Figure 21b. December 11, 1988 view of Aguajita Wash, the largest drainage adjacent to Quitobaquito . . . . .	66

## LIST OF PLATES

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Many people have given time and talent at one time or another during the preparation of this history. Personnel of Organ Pipe Cactus National Monument gave us access to their photograph files and made important corrections in the manuscript. Denny Fenn read the manuscript and made many valuable suggestions. He has also overseen the typing and production of the final product. We wish to thank Raymond McKee, Tucson Parks and Recreation Department, for providing the photograph of the Kino statue. Instead of using an inferior modern copy, Donald Sayner of the University of Arizona provided us with an exquisite original copy of the Kino map from his personal collection on page 11. We also thank Anne Stanichoff, one of Donald Sayner's students, for the artwork on the maps and for map photography. We wish to thank the heirs of the Eugene Bolton estate for giving us permission to revise and adapt the map appearing as Plate I.

The authors have never met Jerome Greene who in 1977 wrote the historic resource study for Organ Pipe Cactus National Monument. We believe that he must have loved his work because it is so detailed and reads so well. His report gave us direction for finding obscure sources and also furnished much quotable material.

We wish to acknowledge R. Roy Johnson's unflagging support and editorial assistance at all phases of the project. Roy has provided his research data but also served as the technical editor for this report.

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Scotti (Warren) Steenbergh, now retired from the National Park Service, served for many years as a Research Scientist at Organ Pipe. We appreciate the hours that he took from his gardening hobby to share his recollections. During the crucial 1960's Scotti was not only an observer of what happened at Quitobaquito, he actively participated in the events that took place there - always trying to inject an ecological perspective into the administrative decision being made.

Another National Park Service retiree, Wilton (Will) Hoy shared his recollections and his voluminous unfinished manuscripts about Organ Pipe Cactus National Monument history. Will gleaned much original data about Sonoita, Mexico, from old timers whose recollections would have been lost forever without his initiative. Will reviewed our manuscript twice.

## INTRODUCTION

Quitobaquito, a water hole in the desert, is an ecological singularity: everything there stands in sharp contrast to its surroundings. Here are water, high soil moisture, hydrophilic plants, high biomass, and humidity in contrast with the surrounding desert where the environment is arid and the biomass is low.

Every culture and ethnic group that has been here has left a mark. People have occupied and used the Quitobaquito Springs for centuries, perhaps millennia. Greene (1977) and Teague (personal communication) agree that Quitobaquito is the oldest continuously settled place within Organ Pipe Cactus National Monument; a consequence of the dependability and quantity of its water supply. The springs have served as a hunting ground, resting place, and homesite. The area has been shot up, dug up, plowed, channeled, bulldozed, built upon, knocked flat, and otherwise "improved". The cumulative effect has been one of profound change. Now, in the stewardship of the National Park Service, alteration by humans continues; its natural environment reflects its cultural history.

In 1980, the Cooperative Park National Resources Studies Unit at the University of Arizona began an interdisciplinary study of Quitobaquito Springs for the purpose of producing a long range thematic plan for management. An important element of this plan is to promulgate a coherent purpose and a consistent long term management philosophy for the area. We hope that this will provide a unity of purpose for administration. Another aspect of this study was to illustrate the linkages between the cultural history and associated ecological change.

Employees of the National Park Service have photographed Quitobaquito since the establishment of the monument in 1937. Collectively, the photographs serve as an effective tool for evaluating change. During the past 50 years, remarkable changes in land use and management have taken place.

## QUITOBAQUITO'S HISTORIC BACKGROUND

### The Indian Period (9000 b.p. - 1698 a.d.)

The Tohono O'odham (Papago) and the Hia Ced O'odham (Sand Papago) peoples lived at Quitobaquito long before Europeans arrived in North America. The Quitobaquito spring oasis lies at or near the common edge of two areas occupied by these peoples. The numerically smaller Hia Ced O'odham population

was localized around the Sierra del Pinacate in Sonora, Mexico, 40 miles southwest. The larger Tohono O'odham population inhabited a much larger territory lying between the Gila River to the north and the Rio Magdalena to the south (Manje 1954, Ezell 1983). These two closely related groups apparently lived harmoniously since they left no evidence of defensive structures or fortifications.

The Quitobaquito springs were probably undeveloped seeps, perhaps appearing much like today's Burro Springs to the north. Small pools may have been dug so that portable water jars or dippers could be conveniently filled without muddying the spring water. The current pond at Quitobaquito was excavated by non-Indians at a much later time.

There is an ancient O'odham shrine at the side of the modern road 0.5 mi. east of Quitobaquito, a heap of fist-sized stones, that concisely illustrates how man affected the area. Quitobaquito was shaped by three cultures uneasily juxtaposed: the O'odham, the Whites, and the National Park Service. For a long time, each passing O'odham placed a stone on the pile to commemorate his visit. The stone pile enlarged with visits as the years passed. When the present road was built, the pile was four feet high. The Organ Pipe Cactus National Monument trail guide describes the shrine for the motoring visitors driving past. But the idea of tossing a stone on a pile when passing by somehow does not connect with White culture; it is not part of the mind-set. However, Whites do understand caching articles of value and some tourists dig holes in the pile to find the "treasure." But there is nothing to be found, the trail shrine is simply a pile of stones. Now and again, National Park Service employees stop to refill these holes with the tourist-scattered stones. Here, at this one small spot, the cultural bias of the three groups that have shaped Quitobaquito can be seen in action: The Indians signal their presence on the land, the Anglos, not understanding this, dig to uncover whatever is buried there and National Park Service people try to make repairs.

West of Quitobaquito is an Indian cemetery. Mostly Hia Ced O'odham people are buried there and most of these are members of the Orosco family (Bell, Anderson, & Stewart 1980). Thomas Childs, a White who married a O'odham woman, tried to change the O'odham burial customs. He wrote:

"I made their first coffin at Quitobaquito in 1904. But they didn't get the idea. Sometime after the first customer used the box another Indian died. They dumped out the bones and put in another new corpse" (fide Greene 1977).

The Indians, still buried at Quitobaquito in the tradition way remain; Thomas Childs is gone; some things endure and others do not. Conflicts of purpose here continue to produce confusing results.

## The Spanish Colonial Period, Kino and Garces (1698 - 1821)

Travelers found it convenient to move along water courses when crossing this part of the Sonoran Desert before the advent of motorized transportation. Because a mule or horse drinks 15 to 20 gallons of water every 24 hours, a team of four uses 480-640 pounds of water a day<sup>1</sup>. Wagons heavy enough to carry such quantities of water tend to mire in the sand and move slowly. Alternatively, traveling by horse and pack mule is speedier than by wagon but since water cannot be carried, travel distance is more or less limited to a "days ride" from water. Thus the advantage of traveling along streams in desert country are obvious. The Rio Sonoyta, to the south, rarely goes dry in the vicinity of Quitobaquito and its proximity, less than a half-mile away, this ensuring that early travelers passed this way.

Captain Melchior Diaz may have traveled along the Rio Sonoyta during his explorations in the mid-16th century (Bolton 1948), but the Jesuit priest, Eusebio Kino, provided the first known written description of Quitobaquito:

On the 7th [October, 1698], on leaving from San Rafael [Guivave, Arizona] for San Marcelo [Sonoyta, Sonora], [the Indians] gave us another 11 little ones to baptize. At midday I located the sun with the astrolabe and found myself with a solar altitude of 52 degrees. With the 5 degrees and 29 minutes of declination of the sun, today we are at 32 degrees and 30 minutes, North Latitude.<sup>2</sup>

After traveling 11 leagues<sup>3</sup> we arrived in the company of the new Governor himself of San Marcelo and of others who accompanied us. They gave us 24 little ones to baptize.

---

<sup>1</sup>A gallon of water weighs roughly 8 pounds four animals would use as much as 80 gallons per day, which weigh about 640 pounds.

<sup>2</sup>Dr. Ronald L. Ives, Palo Alto California wrote of this passage that "Kino measured latitudes by the well-known and effective meridian altitude method and found his daily corrections in Aigenler's Tables, a copy of which he carried with him in the field. The formula which is used to convert solar altitude to latitude is as follows, being sure that the sun's altitude is measured exactly at noon, which Kino determined with his portable sun dial: 90 degrees minus (solar altitude plus declination of day in question) equals latitude." He continued, "With regard to Father Kino's measurements and calculations, they are surprisingly accurate. It would be hard to improve on them today, using the same equipment and methods" (fide Smith, Kessell & Fox 1965). Thus, we may be sure, Kino was able to keep track of his travels and navigate with certainty.

<sup>3</sup>League, a measure of distance, had no standard value. Comparison of Kino's leagues with known distances, give 2.5 miles per league.

In the afternoon we left for the good place which we named San Serguio [Quitobaquito] and another four leagues along the arroyo [Rio Sonoyta] which goes to the sea. It has water which runs in many places, ciénegas, tules, and ducks and birds from the marshes, and excellent pasturage for the cattle. From San Marcelo [Sonoyta] there are irrigation canals and flat level lands for planting, although this year they had not sowed these except for many squashes, being that in the rest of the preceding ranches of San Rafael and of San Francisco, we had found much corn, beans, watermelons and squashes.<sup>4</sup>

On the 8th we set out for the sea accompanied by the new Governor and Fiscal Mayor of San Marcelo del Sonoidag. We went with the precaution of loading the mules with crates full of ollas and gourds to carry water and grass, as the guides did not tell us that on the road and not very far from the sea, there was water and grass and even a rancheria of people with their cornfields and squash. Consequently, we left the crates and gourds and pack mules at this place of San Serguio [Quitobaquito], and we set out for the rancheria of the sea which we named Santa Brigida, it being her day. We arrived at sunset, after 18 leagues of a very good road with enough running water grass, reeds, and tules. . . .

They [the Indians of Santa Brigida] told us that from a nearby hill which we also named Santa Brigida [Sierra del Pinacate, Sonora] could be seen the very close Sea of California and the mouth of the Rio Grande [Gila River] and its sand dunes, which are a little more to the northwest. . . .

On October 9 . . . We left for the hill of Santa Brigida, taking as a guide the new Fiscal, traveling and ascending about seven leagues over a somewhat rough road. At midday we arrived at the top, from where we saw in the distance the very close Sea of California [Gulf of California] with a nearby excellent port or bay [Adair Bay, Sonora]. According to its latitude of 32 degrees, it must be the one the old cosmographers called Santa Clara on their maps. It has the entrance to the southwest and to the east of the entrance, two flat-topped rocks or small hills. . . . We saw clearly, also, the sand dunes of the mouth of the Rio Grande, and the Fiscal showed us where the Colorado river joined the Rio Grande which is about a day's journey before they enter the Sea of California together. . . . (Smith, Kessell, & Fox 1966).

The account of this particular visit, had particular significance for Organ Pipe Cactus National Monument, for science, and for Kino's future plans. In addition to his usual ecclesiastic activities, he was charged on this trip with following the Rio Grande [known today as the Gila River] to the sea (Bolton 1984).

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<sup>4</sup>The meaning of this sentence has always been obscure.

Leaving his headquarters at Dolores (near the present town of Magdalena, Sonora, Kino traveled northward reaching the Gila River in the vicinity of Casa Grande. He then traveled southwesterly to Sonoyta, Sonora, where the quoted portion of the diary finds him. Plate I, located in the pocket at the back of this report, is a map of the Pimeria Alta, drawn in 1936, showing towns, missions, and Indian villages known to Kino. The Camino del Diablo and other routes of discovery used by Kino for exploration of the Organ Pipe Cactus National Monument area are indicated, along with the few modern place names. Figure 2 shows a modern sculptor's rendition of Father Kino on horseback.

The Spanish Crown was interested at this time in establishing a safe overland route between its colonies in Mexico and its holdings in California, including Baja California (Chapman 1915). The Crown was also eager to explore and inventory the little known northern portion of the Sonoran Desert which Kino called the Pimeria Alta, roughly the land between Magdalena, Sonora, and the Gila River, Arizona. Between 1687 and 1706 he explored and mapped 76,000 square miles of this region.

In 1696 California was widely believed to be an island, as clearly shown Eusebio Kino's map of Northern Mexico, *Teatro de los Trabajo Apostolicos*, drawn in 1695-1696. This map is shown as Plate II, located in the pocket at the back of this report. Kino relied heavily on the observations of other geographers for the preparation of this map. The great distortion caused by inaccurate observations are apparent. Kino's own cartographic skills were very good and he set high standards for himself. Compare the map in Plate II with the one he prepared 6 years later using his own observations (See Plate III on page 11 of this report).

Sea travel across the Gulf of California was difficult because there were few satisfactory ports and few ships available for ecclesiastical purposes. The ships available were needed elsewhere by the military/industrial complex of Kino's day. Transportation of colonists, priests and cattle had a low priority. Kino's observations, quoted above and made from the top of the Sierra del Pinacate, assume great significance because they promise a land route between Spanish possessions in Mexico, New Mexico, and California. He became suspicious that California was not an island when he saw sand dunes that appeared to be at the head of the Gulf of California.

On this trip Kino pioneered portions of the routes later followed by the Butterfield Overland Mail road (Conkling and Conkling 1947), U.S. Interstate 19, U.S. Interstate 10, the

famous "Camino del Diablo" (Devils Highway, which would remain a major route of travel to California for the next 200 years), Mexico's Federal Hwy. 2 adjacent to the Quitobaquito area and Federal Highway 8.

Kino's 1698 visit marked the first impact by Europeans on Quitobaquito. He did not travel light; in addition to his church staff, he was usually accompanied by a military escort and plenty of spare pack and riding stock. On this trip he used 85 head of horses and mules. Most of these animals were pastured at Quitobaquito from October 8 and 11 (Bolton 1984). This amounts to more than 212 animal-days, heavy usage for so small an area. Quitobaquito furnished the best water and grass between Sonoyta and Yuma for as long as the Camino del Diablo route was used. We assume that grazing pressure upon the fragile natural resources began at this time. Grazing pressure would increase in the years to come, producing profound vegetation changes at the site.

In 1699, Kino, this time accompanied by Captain Juan Mateo Manje, was back at Sonoyta with 36 head of cattle to be left in care of the Indians for his use on future expeditions. The cattle were also to provide meat for "the support of the fathers of California if they should, perhaps, be able to find a way to this area" (Manje 1954)<sup>5</sup>. He left instructions for digging canals to irrigate wheat fields and for the construction of a small church. This marks the probable date for the first introduction of European agricultural weeds and cultivars into the region and the beginning of ranching and farming in the area.

When Manje returned to Sonoyta in 1701 he found that the 36 cattle left in 1699 had increased to 80, the wheat had been planted and harvested, and the little church was freshly whitewashed. Leaving Sonoyta, Manje's party headed west with 150 horses and saddle mules, making camp for two days along the Rio Sonoyta at Comaquidan, in the vicinity of Quitobaquito. Manje and Kino do not say if they stopped at Quitobaquito. Since Manje complains that "the water commences to be oily and brackish in taste" at Comaquidan, it would be strange if they did not send back to Quitobaquito for drinking water (Manje 1954).

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<sup>5</sup>Kino was accompanied on his trip of 1698 (when Quitobaquito was first visited) by Captain Diego Carrasco. Although Capt. Carrasco kept a diary as ordered, it is unfortunately almost word for word identical to Kino's dry account. But the 1699 trip and again in 1701 Kino was accompanied by his usual military escort Captain Juan Mateo Manje, an excellent and chatty diarist whose philosophy and interests went well beyond the military and were often parallel to Kino's.

Figure 2. Eusebio Kino, SJ. Born August 10, 1645, at Segno in the Italian Tyrol and died March 15, 1711 at Magdalena, Sonora. This larger than life-size bronze was sculpted by Julian Martinez, of Mexico City. The statue was commissioned by the Arizona Historical Society using funds raised by donation. An international effort was required to transport the 5-ton bronze, cast in Mexico, to Tucson. No likeness of Eusebio Kino has yet been found. Artists base their renditions of his features on characteristics exhibited by Kino's family which still resides in the Italian Tyrol. The sculptor's rendition of Kino's dress and the horse's equipment are historically accurate. Photo by Raymond J. McKee, Tucson City Parks and Recreation Department Photographer.



From Comaquidan [which can no longer be located] the party continued westward just south of the Sierra del Pinacate reaching the Gulf of California at Adair Bay. The mountains of Baja California were clearly visible across the gulf. Kino had observed earlier that the Indians on its Sonoran shore did not have boats. On this trip he saw that they had "blue shell" ornaments. These shells were probably abalone. From earlier travels in Baja California Kino knew that these shells were found only on the Pacific coast of California and did not occur within the gulf. He reasoned that the Pacific coast shells came into possession of the Indians at Adair Bay via a land route and not by sea. With the visual evidence from the crest of the Pinacate and the evidence of the "blue shells," Kino and Manje concluded that California was likely not an island (Bolton 1984, Manje 1954). Kino drafted and published a new map which he called "Land Passage to California and its neighboring New Nations and New Missions of the Company of Jesus in North America. 1701" (See Plate III).

Kino was again able to peruse his scientific and geographical interests in February and March, 1702. On this trip he crossed the Colorado River at 32 degrees 20 minutes just south of Yuma. He continued south, reaching the Gulf of California at a latitude of approximately 32 degrees. He had confirmed beyond doubt that his map was correct and that California could be reached by land travel.

Since arable land on the peninsula was so limited by topography and climate, the Baja California missions were unable to be entirely sustain themselves by agriculture. Kino's plans to expand Fr. Salvatierra's Baja California missions by supporting them with agricultural operations at Sonoyta never bore fruit. His last years were spent in a futile effort to gain funds and support for the his Pimeria Alta work and in combating politically inspired untrue accusations made by jealous church officials in Mexico. He died at Magdalena, Sonora in 1711 and was buried beneath the floor of the church he founded there. With his death the Jesuit mission system in northern Mexico and southern Arizona began a rapid decline (Polzer 1974).

Ironically, Kino is better and more fondly remembered today than are his once highly placed detractors. He lives on in the people's minds and the travel routes he found are still in use.

The final chapter in the history of the mission San Marcelo del Sonoidag was written during the Pima Revolt of 1751. Kino was never able to convince the authorities to assign a resident priest to San Marcelo and for years it remained a visita for traveling clergy. Father Enrique Ruhen became the

the only resident priest assigned to Sonoyta after Kino's death. In 1751 he was directed to repair and activate the church and outbuildings. This work was apparently nearly completed when, on November 22, 1751, the Indians revolted spreading death and destruction from Saric to Sonoyta. Ruhen and two assistants were killed in the night. Survivors from Sonoyta buried the dead beneath the floor of the razed church. As time passed, the adobes melted away. Flooding and erosion caused the town to move a mile and a half to the west, leaving the old church site abandoned.

San Marcelo's stone foundations persisted into the 20th century when Mikul Levy, who kept a store at Quitobaquito for a while, excavated the ruins after he received permission in 1907 to search for Jesuit treasure supposedly buried there. Ygnacio Quiroz, Levy's employee and amateur archeologist, did the work and made good notes, thus preserving the only information extant about the construction details of one of Kino's original small churches.<sup>6</sup> All that remains at the site today is a bronze and stone memorial to Ruhen erected by the people of Sonoyta ... atop the knoll where the old mission stood. It reads<sup>7</sup>:

Aqui, en la esperanza de la resurreccion,  
  llacen los restos del  
Reverendo Padre Enrique Ruhen, S.J.,  
  16 Jun. 1718-22 Nov. 1751.

The Jesuit order was expelled from New Spain in 1767, their property seized and the priests arrested and deported to Spain. The Jesuit property and administration of religious matters in the Pimeria Alta was turned over to the Franciscans in 1768 (Cline 1963). At this time the Franciscans founded their mission chain along the California Coast. California agriculture promised easier riches and greater prosperity than did the hard-scrabble farming in the Sonoran country and much of the Franciscan effort was focused on the coast. Expansion and prosperity made communication between the settlements and

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<sup>6</sup>The remains indicated that the church was made of adobe standing upon a stone foundation. The interior dimensions were 24 ft. x 34 ft. The building's long axis was oriented north and south. The floor was made of a light colored hard mixture of sand, clay, and caliche which had a semi-polished surface. Beneath the alter, which lay along the north wall, 3 burials were found. Two of the skeletons are believed to be Mexican/Indian church servants. The third was of a large man with blond hair and probably represents the remains of Father Ruhen (*fide* Ives, 1955).

<sup>7</sup>"Here, in the hope of resurrection, lie the remains of the Reverend Father Enrique Ruhen, S.J., 16 June, 1718 - 22 November 1751."

### Plate III.

Kino's map depicting California as a peninsula, 1701. The map reproduced here is the French edition of his map, "Passo Por Tierra a la California" printed in Kino's lifetime. This map, though crude by 20th century standards, is usable and not overly generalized compared to the map of 1696 (Plate II).

Cartographers of Kino's day were able to map latitudes quite accurately using the astrolabe for measurement of sun height at noon. Kino's astrolabe was 14" in diameter; a state of the art instrument in his day. However, a means of measuring time accurately is required for determination of longitude. Accurate timepieces hadn't been invented yet so Kino relied on a sun dial for navigation. As a result, his maps have east-west distortions (compare the relative widths of Baja California and the Gulf of California).

Shown on this map are the Sierra de Santa Clara (Sierra del Pinacate), San Marcello (Sonoyta), and the Rio de Hila (the prominent east-west stream in the upper third of the map). The Rio Sonoyta (not labeled), runs just south of the Sierra de Santa Clara.

## PLATE III

## PASSAGE PAR TERRE A LA CALIFORNIE

*Découvert par le Rev. Père :  
Eusebe-François Kino Jésuite  
depuis 1698 jusqu'à 1701  
ou l'on voit encore les Nouvelles  
Missions des P.P. de la Compagnie de Jésus*

Tom. 8. Pg. 52

Cutganes 1701.

— Donald B. Sayner Collection

administrations of New Mexico, Old Mexico, and California an ever more pressing necessity.

In 1774 Captain Juan Bautista de Anza led an expedition accompanied by the Franciscans Juan Diaz and Francisco Garces, from San Xavier del Bac (Tucson). They traveled west to Sonoyta, where they joined the Camino del Diablo on their way to Mission San Gabriel, southern California. The de Anza trip of 1776 took emigrants from Tucson and Tubac down Santa Cruz River to Pima Villages on Gila River then west to Yuma crossings to found San Francisco and settle in California (Coues 1900). Quitobaquito provided water and pasture along the way.

Between 1781 and 1782 Lt. Col. Don Pedro Fages, military governor of Alta California, led a punitive expedition into the Yuma country to rescue the survivors of an Yuman Indian revolt. He returned via Camino del Diablo and stopped at Quitobaquito (Ives 1967).

#### **Mexican Period--Revolution and Independence (1822 - 1853)**

As the Spanish Crown gradually lost vitality, its effective support of Mexico weakened. Settlements such as Tubac, Tucson, Guebavi, etc., languished. A series of revolutions beginning in 1810 culminated in independence from Spain in 1821. The new government was as impoverished as the old, and was too preoccupied with settling a centralist vs. federalist debate to pay much attention to its northern frontier.

Between 1832 and 1853, the United States and organizations of its citizens, annexed under force of arms more than one half of Mexico's territory. The treaty of Guadalupe Hidalgo, signed by President Polk in February 1848, acquired much of present day Arizona, California and the state of Nevada for \$15 million. Five years later, President Pierce signed the \$10 million Gadsden Purchase, which authorized the purchase of the territory south of Arizona's Gila River and a portion of the current state of New Mexico.

The discovery of gold at San Francisquito Canyon in southern California in 1842 and at Coloma at Sutter's Mill in 1848 provided the economic incentive for migration of Americans to the west. The Gold Rush caused a flood of California-bound travelers to flow through Sonoyta and past Quitobaquito en route to the gold fields. The Camino del Diablo route into California was short and comparatively level. However, the sandy road and lack of ample water remained important barriers. Hornaday (1908) reported that 300-400 persons died from exposure and mishap along the Camino during this time.

There are no descriptions of Quitobaquito from this time period but we may assume that grazing use of the area continued to be heavy. Sonoyta served as an oasis, rest and food stop, landmark for travelers, and a target for Apache raids (Velasco 1861).

#### **The United States and Arizona's Territorial Period (1854 - 1912)**

The United States was quick to take advantage of the territory newly taken from Mexico. In 1854 Andrew B. Gray's survey for the Texas Western Railroad Co. along the 32nd parallel rested at Quitobaquito. He wrote:

Sonoita, by my observations, in latitude 31° 51' 19" north, and a short distance below the limits of our territory, is an Indian town, where the Gobernador of the Papagos resides. There are also a few Mexican families. The valley is broad, with springs, and a small stream (the Sonoita) which flows a few miles in the dry months, when it sinks, like the river of San Diego in California. During the rainy season it extends for a long distance toward the Gulf (Gray 1963).

In 1855 Lt. Nathaniel Michler (U.S.) and F. Jimenez (Mexico) began a joint boundary survey pursuant to the terms of the Gadsden Purchase. Michler wrote:

[Sonoyta] is a resort for smugglers, and a den for a number of low abandoned Americans, who have been compelled to fly from justice. Some few Mexican rancheros had their cattle in the valley near by. It is a miserable poverty-stricken place, and contrasts strangely with the comparative comfort of an Indian village of Papagos within sight (U.S. House of Representative 1856).

In 1856 Michler noted that "at Quitobaquito there are five springs running for the greater part of the year" (U.S. House of Representative 1856). Today, only two springs flow year round.

Plate IV contained in the package at the back of this report shows a topographic map of Quitobaquito Spring. Elevations are in feet above sea level. Contours on land are solid lines and those below the pond surface are dotted. Springs and seeps are shown in black.

Mexican surveyors established one of the primary boundary markers at Quitobaquito in 1855. Based on numerous precise astronomical observations, Quitobaquito's latitude and longitude was accurately established for the first time (Humphrey 1987).

In 1857 Henry A. Crabb (a former U.S. Senator) assembled part of a private army at Dowling Ranch (15 miles east of Quitobaquito). Some of his stock was pastured at Quitobaquito. His objective was to take advantage of chaotic conditions prevailing at the time, and take control of the State of Sonora. Crabb surmised that the Sonoran authorities were too dispirited and distracted to mount an effective defense. He had badly miscalculated and his forces were wiped out (Forbes 1952, Wyllys 1940). He and all men killed except for a 16-year-old boy who was released.

The U.S. and Mexican boundary survey reported Sand Papago "renegades" residing at Quitobaquito in 1896. Two Mexican families were living in houses near the spring. The area continued served as a resting spot for travelers. The boundary commission reported that Quitobaquito pond was located on the U.S. side of the line but was used to water a field "near" the river in Mexico. If the river was the Rio Sonoyta, this was the first account of an irrigation system running that far to the south. The importance of this is the implication of a pathway for fish and turtles from the river to the pond. Six "native" huts were standing near the pond (U.S. Senate 1898).

In 1904, Thomas Childs was in residence at Quitobaquito. He rebuilt the Dorsey irrigation ditches, raised watermelons and other crops. He believed the soil too alkaline for most things he wanted to grow (Hoy 1970c). By 1907, Childs was joined at Quitobaquito by John Merril and Reuben Daniels. The Indians had left. Only four of the eight houses were habitable (Hornaday 1908).

When W.T. Oldham built a one room cabin with a well near Aguajita Wash in 1920, Quitobaquito area was becoming settled. Alfred Jenkins built a one-room shack and well near Aguajita Wash in 1937 and used a gasoline pump to irrigate a small field of potatoes (Hoy 1970a). Oldham and Jenkins moved away at the beginning of World War II. The Gray brother's established facilities at Aguajita but only used it for watering, not operations. Bobby Gray complained that there were so many wild burros in the vicinity that their braying made sleep impossible (Hoy, 1970b).

#### **Quitobaquito -- The Entrepreneurial Period (1860 - 1904)**

Charles Poston, an Indian Agent and "father of Arizona", noted Quitobaquito as having 250 Indians resident in the vicinity (Cook 1967). The Lopez family settled at Quitobaquito in the mid-1860's and raised goats. The Lopez goats are the first recorded livestock resident at Quitobaquito. Earlier settlers probably had some riding stock that they kept in the vicinity

of the springs. The Lopezes remained until the late 1880's (Greene 1977).

In 1863 Andrew Dorsey arrived at the pond, becoming the first Anglo settler to join the neighboring local Indian population. He immediately made improvements, establishing a small community that he named Frémont (Greene 1977). He opened a store, dug a pond, and put up a dam to contain the pond. Irrigation ditches were dug out to fields south and west of the pond. Dorsey married Rita Celaya of Altar and their child Remigio Andrew was born at Quitobaquito in 1886. Corn, cereals, melons, figs and pomegranates were planted. Some of the fruit trees survive today near the pond and serve as a living testimony of Dorsey's early attempts to cultivate the area (Hoy 1970b). Dorsey remained at Quitobaquito until 1892.

There was a surprising amount of commercial activity in the vicinity of Quitobaquito during this period. In addition to Dorsey's store, established in the mid-1860's, Albert Steinfield, of Tucson, and J.C. Waterman, a mining promoter, opened a mill and store in about 1870. The Steinfield and Waterman enterprise folded in the 1880's for lack of business, perhaps due to competition with Dorsey (Greene 1977).

Mikul G. Levy opened a store just west of the pond in 1888 while the Dorseys were still in residence. Levy's store sold food, clothing, mining supplies, and other hardware, imported from Caborca (Hoy 1970a). Jose Lorenzo Sestier, a Frenchman, settled at Quitobaquito, becoming Levy's store manager. When Sestier died in 1900, Levy personally freighted the cement for his grave from Tucson and helped construct the Mexican style headstone (Hoy 1970b, Sullivan 1988).

Levy wrote on the marker:

Q en P.D.<sup>8</sup>  
Jose Lorenzo Sestier  
Born Brest, France  
Died. Quitobaquito.  
Feb. 9, 1900  
Age 74

Jose León succeeded Sestier as storekeeper. Levy changed the name of his mine from "La Americana" to "La Victoria", the name of Jose León's wife.

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<sup>8</sup>Q en P.D. most likely is an abbreviation of Que en Paz Descansa (rest in peace).

W. J. McGee (1898), writing for the National Geographic Magazine, visited Quitobaquito and wrote:

The entire white population (Mr. M.G. Levy, merchant, mine owner, justice of the peace, and deputy sheriff) was avidly hospitable, the native residents attentive, as became the unusualness of the event; and the side-barrels and half dozen canteens of the outfit were soon filled with the slightly alkaline yet palatable and wholesome water from the spring.

Cipriano Ortega was one of the most colorful and important characters in the Quitobaquito area: a rough character and rumored to be a highwayman who robbed travelers on the Camino del Diablo, he later became a respected citizen. He became patron of a self sufficient settlement, Santo Domingo, six miles east of Quitobaquito. It remained headquarters for Ortega's cattle ranching and mining operations until his death in 1904. Ortega had 300 acres under cultivation, raising grains, melons, beans, and fruits. The Mexican government established a customs station with Ortega in charge. There was housing for the workers, office space, metallurgical mill and smelter, granaries, barns, corrals, a smithy, a commissary, and a soap factory (Hornaday 1908). The soap factory is especially noteworthy because soap was made from burro fat - these feral animals being abundant regionally. One traveler estimated that 3,000 burros roamed free between Hermosillo and Sonoyta at this time (Hoy 1970a). At the turn of the century Santo Domingo was nearly as important as Sonoyta.

Ortega was interested in mining and had holdings in Mexico and the United States. He visited Quitobaquito often, looking after his cattle and operating an arrastre (mill) for the grinding of gold or silver ore. The O'odham people seemed to have a deep and abiding suspicion of Ortega and when he was in residence they moved away (Greene 1977). Some time during the 1870's Ortega acquired the "La Americana" mine in the Sonoyta Mountains, which yielded a \$80,000 profit in silver. Some ore may have been taken to Quitobaquito during the early phases of "La Americana" development, but later it was packed to Santo Domingo and ground in steam-driven arrastras, the machinery having been imported from Brooklyn, New York. Ortega worked the "La American" mine vigorously until sometime in the late 1890's when he either ran out of easily reached ore or else feared for his investments north of the border. In any event, he pulled the timbering out of the shaft, allowing it to collapse (Appleman & Jones 1969b). He sold the mine to Mikul G. Levy. Santo Domingo did not long survive Cipriano Ortega's death in 1904 for when the MacDougal party passed Santo Domingo on their way to the Sierra del Pinacate in 1907, the rancho was falling into ruin and the customs house had been moved to Sonoyta (Hornaday 1908).

## The Orosco Family -- the Longest Resident Family (1887 - 1957)

The Orosco family arrived in 1887 and lived at the pond longer than any other Indian family or white settler that we know about. Luis Orosco had lived there sometime earlier but had been driven away by Mexicans angered over his raiding of travelers. After many years, having given up the old ways, Louis returned and lived there quietly until his death.

Jose Juan was born to Luis and his wife around 1890 and lived at Quitobaquito until his death in 1946. He is the first Orosco about whom we know many details. Jose Juan irrigated 2 hectares of land for corn, figs, melons, and pomegranates using the springs, pond and ditches developed by Dorsey. Two-thirds of his fields lay in Mexico. Orosco had 75 to 100 head of cattle, sheep, goats, and riding stock. His stock grazed freely on both sides of the International Boundary, which was not permanently fenced until 1947. He built a large molino (flour mill) for grinding his corn into meal. The mill stone has been removed from Quitobaquito but can be seen leaning against the front of the Organ Pipe Cactus National Monument Visitor Center.

When Jose Juan died in 1946, he was buried in the small cemetery near Quitobaquito (Bell, Anderson and Stewart 1980). His overcoat, saddle and some canned goods were left as grave offerings. These were soon stolen however (fide Greene 1970).

Jim Orosco, son of Jose Juan, was born around 1905 at Cipriano Well, about 8 miles north of Quitobaquito, at a time when the Indians found it politic to leave Quitobaquito for awhile. Jim was unclear about the reasons that his family was forced to move or what the problem was. He later returned with his family and married Maria Antonio, who bore him a son. After Jose Juan's death, Jim and the rest of the family lived at Quitobaquito. Jim inherited his father's estate. Abe Gray (one of the Gray brothers grazing cattle on the monument) was appointed his executor. First occupying a house on the bench above the springs, Jim later moved to the adobes beside the pond. Improvements existing shortly after Jose Juan Orosco's death were the pond (approximately 1.5 ft. deep and 0.5 ac. in size); one single-room adobe house; one jacal built in 1947; one tin shack; two livestock corrals; 4,000 ft. of irrigation ditches, 700 ft. of which were in Mexico; eight fig trees; 22 pomegranate trees, nine of which were in Mexico; an adobe or stone building in Mexico and 6 1/2 acres of farmland, one third of it in Mexico (Hoy 1970a).

Eventually, Jim was forced from the land by the Park Service's growing resolve to acquire inholdings and eliminate cattle grazing. Orosco was advised that a permanent fence would be

built along the International Boundary, dividing his property between Mexico and the United States, making access difficult.

Even though this clearly was a violation of the Treaty of Guadalupe Hidalgo which provided that the indigenous peoples could move freely across the boundary, in 1955, Jim reluctantly agreed to sell his rights to the Government and on July 8, 1957, he turned over the 15 acres he occupied to the National Park Service for \$13,000 (Cook 1967). This presumably extinguished his grazing rights but research has failed to bring to light any documents specifying exactly what the government bought. The Gray Brothers continued their cattle operations at Aguajita, Williams Spring, and other places in the immediate vicinity of Quitobaquito.

#### Modern Explorers (1907 - 1917)

The Macdougal - Hornaday expedition visited Quitobaquito in 1907 on their way to the Pinacate. Jeff Milton arrived at Quitobaquito with the MacDougal - Hornaday Party, serving as a guide. They reported Childs, Reuben Daniels, and John Merril were living there but that Daniels was the only permanent resident. Daniels grew some produce and had a herd of goats. A group of small springs ooze from the hillside a few feet north of the boundary line, and in flowing down to the lower ground their waters serve to irrigate a small field on the Mexican side.

Although Quitovaquita was entirely quiet and inoffensive, its atmosphere was depressing. It is one of the spots in which I would not like to die, and would hate to live. Of its eight houses, only four were inhabited, and the others were crumbling to the inevitable ruin that in every vacant adobe house follows swiftly upon the heels of the departed tenant. The waters of the spring have made a pond, but it looks stagnant and unwholesome. There are trees growing about the place, and a sprinkling of brush along the brook of the spring; but the settlement is not inviting (Hornaday 1908).

Daniels seemed to fascinate Hornaday. He asked him, "Won't you tell me what turn of fortune led to settle in a place so little and lonesome as Quitovaquita?" Daniel's replied, "Oh, I'm not staying down here because I'm stuck on the country. Like everybody else, I'm looking for an opening somewhere. But, after all, there are much worse places for a man to live in that little Quito and Sonoyta" (fide Hornaday 1908).

Reuben Daniels had been out of ammunition for some time but was given a supply by the MacDougal party. We found that previous to our visit he had been literally starving for

cartridges, both for his rifle and his six-shooter. Of the large package of cartridges brought down by Dr. MacDougal for Mr. Milton, nearly half were turned over to 'Rube,' who straightway began to revel in them.

When firing was heard ahead of the main body, it turned out to be 'Rube Daniels, shooting at a jack-rabbit.' Later on, when a man was seen to fling himself off his horse, kneel and fire two or three times, it was 'Daniels, killing a coyote.' An hour later, another fusillade resolved itself into another conjunction of Daniels and jack-rabbit. No one tried to keep track of his killings. Although he killed a-plenty, the interesting point was the he was simply overpowered by his desire to shoot things!

Daniels was asked by Jeff Milton to join the trip as his guest. Trouble soon followed and Daniels was asked to leave the expedition following a tense showdown involving a shooting that MacDougal, the leader, considered inappropriate. Daniels was apparently reclusive and perhaps a little unbalanced (Hornaday 1908).

Carl Lumholtz, a geographer traveling in Mexico, visited Quitobaquito in 1910. He noted that:

Futile attempts at cattle raising and mining have been deflected into a dam, now used solely by the Indians. The tiny stream, fed by the springs, carries beautiful limpid water amid banks white with mineral salts; the fresh green weeds at the bottom are also refreshing to behold. When heavy showers fall, connection is made with the Sonoita River, and the same minnows which were seen there were splashing in the streamlet up to its very sources. The dam, of only moderate size, made a charming impression with the surrounding trees and bushes here and there reflected in it. There were a few dark gray and black water hens, one white heron and some ducks, and at dusk seven fine-looking geese swooped down into the pond, evidently intending to spend the night there (Lumholtz 1912).

In 1914, an ethnographic survey team visited Quitobaquito and found 24 Hia Ced O'odham people from four families residing at the site. There is no mention of anglos residing at the pond. Alfalfa was being grown by the Indians (Cook 1967).

In 1917, Kirk Bryan visited Quitobaquito in connection with his water resource study. He noted that most of the Papagos had drifted away because of the turbulent conditions in Mexico. He noted that:



Figure 3a. Quitobaquito area, looking southeast from Sestier's grave (right foreground). The mountains in the background are in Mexico. The Rio Sonoyta flows from right to left in front of the mountains and a 1/2 mile distant from Quitobaquito. The pond lies just beyond the cottonwood trees left center. Photograph was taken December 8, 1950 by Superintendent Wm. R. Supernaugh. Supernaugh's caption labels the wash running through the middleground (from left to right and marked by the line of mesquites (*Prosopis velutina*) running in front of the building) as "Washes from springs." These washes terminate 1/4 mile north in an area paved with silicious sinter which is now dry but was at one time the main Quitobaquito spring. The buildings (from left to right are: U.S. Border Patrol houses (2 buildings, see Figure 7a), U.S. Bureau of Animal Industry building, Jose Juan Orosco's house, and U.S. Bureau of Animal Industry housing (2 buildings). The open areas in the vicinity of the buildings to the left are corrals. Jim Orosco's jacal house is outside of the picture to the left. [Photo from Organ Pipe Cactus National Monument files OPC-51].



Figure 3b. Photograph of Quitobaquito, looking southeast from Sestier's grave, taken December 11, 1988. All of the buildings, including the foundations of Mikul Levy's store were razed in 1961. The entire area was scraped clean with a bulldozer. This scraped area is populated by a dense stand of Seep-weed (*Suaeda moquinii* Felger in preparation). This species often indicates areas of intense disturbance. Supernaugh's wash (made visible by the line of mesquites must be the one referred to by Lumholtz as connecting to the Rio Sonoyta. If so, the old springs (now dry) must have been flowing heavily. The springs above the pond that are now active do not lie in a drainage nor does the pond. It is difficult to see how these springs could be the ones referred to. The foreground soil now shows fewer cobbles than in 1950. This effect is likely due to recovery from trampling following removal of cattle and the consequent reduction in sheet type soil erosion. The shrubs just beyond are seep-weed with some mesquite, bursage (*Ambrosia deltoidea*), and saltbush (*Atriplex polycarpa*). This stand shows the effects of release from grazing disturbance but has failed to form a dense stand. This contrasts to the vegetation response where removal of the old buildings caused profound disturbance. [Photo by W. Bubul-Bennett]

There are two main spring openings, and both show evidence of excavation to increase and concentrate the flow. The larger and more northerly opening has a pool about 2 feet deep and is shaped by an overhanging bank. The temperature of the water was 80.3°F. on September 30, 1917. In the other spring opening the water can be seen emerging from joint cracks in a pinkish granite. The temperature of the water was 80°F. on the same date (Bryan 1925).

#### **Cattle Ranching and the Gray Brothers (1919 - 1976)**

In 1919, Johnny Johnson built a house west of Quitobaquito "near" Williams Springs, but was "scared" away by Richard Wright and others who were developing the area. The development of wells and springs likely indicated interest in livestock production (Hoy 1970c). But cattle ranching on a significant scale (aside from Quitobaquito) in the monument began in 1915 when Lonald Blankenship established a ranch a few miles east of Sonoyta (Appleman & Jones 1969a, Hoy 1970c).

It was the Gray family, however that would become synonymous with cattle ranching at Organ Pipe. Robert Louis Gray, Sr. bought out the Blankenship ranch in 1919. Robert, Sr. managed the property well and prospered. He fathered five sons and three daughters who resided at one time or another within the monument. Initially 1,000 head of cattle were run but during the 1920's and 30's their range was extended to a size that more than covered the present monument (Appleman & Jones 1969a, Hoy 1970c). Although the acreage involved in the ranching operation was large, only a few cattle per square mile could sustain themselves on the meager forage and scant water supply. Traditional cattle ranching is quite labor intensive, especially at roundup time. At Organ Pipe there were too few cattle too widely scattered to use traditional methods. The Grays pioneered a new method that was both necessary and profitable. A series of wells were dug or water sources developed. Each well or water source was surrounded by a corral usually made of mesquite. In the dry desert, cattle had to enter the corrals daily to drink. The corral gates were specially constructed so that when they were closed livestock could enter with a gentle push but could not exit. At roundup time, all that was necessary was to have a man secure the specially constructed gates. After the cattle were trapped, a truck was then driven up, the cattle loaded through a chute, and driven away -- no cowboys, no horses, no roundup, no cattle drive, and little expense beyond maintaining the wells, windmills, and corrals. In the 1960's the operation netted about \$40,000 annually. In 1969, an exceptional year, 777 head were sold for \$77,000.

The relationship between the Grays and the National Park Service was never harmonious. The Grays had been on the land for 17 years when the monument was established, and they were understandably threatened by its creation. In 1939 Senator Carl Hayden arranged for the Grays to maintain 550 head of cattle, 25 bulls, and 9 horses on Organ Pipe Cactus National Monument for an annual fee of \$10.00. This agreement was subsequently modified several times. Eventually, the Grays were authorized to graze 1,050 head of cattle for an annual fee of \$610 per year. They were also granted a lifetime permit renewed annually (Appleman & Jones 1969a). The last of the Gray brothers died in 1976, marking the end of cattle ranching on the monument. When the cattle were rounded up, 1,700 head were removed from the monument, a number greatly in excess of the terms of the grazing permit (Hoy 1970a).

#### **The Park Service Era (1937 - Present)**

The region was slowly becoming more settled and the United States Government became a greater factor in the management of Quitobaquito. Sometime in 1887 Jeff Milton, lawman and all around colorful character, was hired to establish an United States Customs and Immigration station at Quitobaquito. He lived at Quitobaquito off and on for many years where he was employed in a number of capacities (Haley 1948, Hoy 1970b).

In 1907, President Roosevelt withdrew from the public domain a strip 60 ft. wide along the entire border for use by customs personnel. No structures are permitted within this boundary zone (Rogers 1958). In 1923, President Calvin Coolidge designated Quitobaquito a public watering place and declared 40 acres of land around the spring and pond to be Public Water Reserve No. 88 (Davis 1957). President Hoover withdrew land by executive order in 1930 at the present site of Lukeville (to the east of Quitobaquito) for an expanded customs station. Construction of that station was not begun until 1940 (Davis 1957, Hoy 1970a). Sixty-nine acres of patented land adjoining the customs reservation became the site of commercial operations there.

U.S. Bureau of Animal Industry station was established at Quitobaquito in 1949. The small station staff was charged with the task of prevention of cattle trespass from Mexico. Two tent frames, an equipment building, and a corral were erected to house the facility (Figure 3). The government built a low concrete dam (still in place) across the spring channel to form a pool. The station was supplied with water through 1,000 ft of 3/4 in. pipe (Hoy 1970a, b). Jim Orosco's objections were ignored, clouding the legal issues of control and possessory rights to the land - was Orosco in possession



Figure 4a. Quitobaquito Pond, looking toward the east from a point partway up a low hill. The flank of the Quitobaquito Hills enters the picture at the extreme left. The Supernaugh's "washes from springs", Figure 3a and 3b, runs from left to right in the middleground. The background mountains are in Mexico. Photograph was taken in October 1956, about the time that Quitobaquito was acquired by the Park Service. The Jose Juan Orosco buildings were still standing. Jim's home and corrals can be seen behind his father's house. The U.S. Bureau of Animal Industry buildings are to the left outside of the picture. The row of four cottonwood trees on the right approximately mark the course of the ditch connecting the springs and the pond. Grazing pressure in the area must be light since the pond (visible just to the left of the cottonwood tree at the extreme right) is invaded by Alkali Bullrush (*Scirpus olneyi*). This is the leaning cottonwood at the south edge of the pond on the dam (See Figures 17a and 17b). [Photo Natt N. Dodge & Jim Eden, October 8, 1956, Monument files 13,518]



Figure 4b. Photograph of Quitobaquito Pond taken on December 11, 1988, shows a dramatic change in vegetation. The area where the buildings were razed in 1961 is invaded by seep-weed. The cottonwood trees are less prominent than in the previous photo because they have dropped most of their leaves. The leaning cottonwood at the extreme right has appears to be shorter because it collapsed following excavation of the pond in 1961 (See figures 15 & 16). Released from grazing and trampling stress, mesquites have now lined the coarse of the wash from the old springs and encircled the pond as a closed stand. [Photo W. Bubul-Bennett]



Figure 5a. This is the easternmost of two overlapping views of Quitobaquito Pond looking toward the south (See also Figure 6a and 6b). The international boundary between Mexico and the U.S. lies approximately 150 feet beyond the dam. The mountains on the horizon are the Sierra Combabe in Mexico. Photograph taken in May 1939. The pond originally constructed by Andrew Dorsey in the 1860's lies in the middleground. The large cottonwood on the far side of the pond is the one shown in figures 11, 12, 13, 14, 16, etc. The vegetation has been heavily grazed. Saltgrass is nearly or wholly absent. The low vegetation is tarweed (*Isocoma acredenia*), graythorn (*Zizyphus obtusifolia*), *Atriplex* spp., and seep-weed. All cottonwood trees growing at Quitobaquito are females and, therefore, do not reproduce. They have surely been planted by Quitobaquito residents. None of these trees appear to be old enough to have been planted earlier than 1900. [Photo F. Pinkley, J. Miller, N. Dodge, Monument files 2642].



Figure 5b. Photograph of Quitobaquito Pond taken in December 1988. Released from centuries of heavy grazing, the vegetation has become exuberantly reestablished as dense stands arranged in a coarse mosaic. The low ground cover is predominantly saltgrass (*Distichlis spicata*). The low shrubs are tarweed and the taller plants are mesquites (*Prosopis velutina* and *P. pubescens*). Although the mammalian fauna is depauperate, there are 65 species of birds seen regularly and 15 species that nest at Quitobaquito (Johnson, Brown, & Goldwasser 1983). [Photo W. Bubul-Bennett].



Figure 6a. This is the westernmost of two overlapping views of Quitobaquito Pond looking toward the south. (See also Figures 5a and 5b). Photograph taken May 1939. Jose Juan Orosco's home appears at the extreme right in the lower photograph. After Jose Juan's death in 1946, the house was abandoned. The automobile bears U.S. Government license plates, the Oroscos relied on the buckboard, parked beneath the large mesquite tree to the left of the car, for transportation. A ditch carrying water from the nearby springs flows from left to right concealed in a depression in front of the car. Livestock grazing has kept the pond and ditch free of Alkali Bullrush. Saltgrass is entirely absent. The low vegetation is tarweed, graythorn, *Atriplex* spp., and seep-weed. The present day pupfish observation pool lies approximately beneath the buckboard. The large mesquite near the buckboard is now dead but the small one to the right is still living (1988). The cottonwood growing on the dam at the far side of the pond is the same shown in figures 11, 12, 13, 14, 16, etc. These trees make good markers of orienting other views. [Photo F. Pinkley, J. Miller, N. Dodge, Monument files 2644].



Figure 6b. Photograph of Quitobaquito Pond taken December 11, 1988. The old ditch between the springs and pond runs diagonally from right to left in this view but it is completely obscured by the mesquite and graythorn plants. The ditch function has been replaced by a buried plastic pipe since 1974. However, enough water bypasses the pipe head or seeps underground to support luxuriant hydrophilic vegetation. Ground cover is saltgrass, Alkali Bullrush, and *Eliocharis rostellata*. The shrubs are all tarweed. All of the vegetation visible in the photograph has grown from seed since the Orosco cattle were removed in 1956. [Photo W. Bubul-Bennett].

of the water rights or not? If the government owned the water and the land, why did they pay Jim Orosco \$13,000 to vacate in 1957? If the government did not own the water rights, why did it appropriate Orosco's water? This issue was apparently never settled.

Edwin McKee, Chief Park Naturalist, Grand Canyon, and later Geologist for the U. S. Geological Survey, was the first to propose establishment of National Park areas for the protection of the columnar cacti in the United States Southwest. McKee's 1931 memorandum and proposal to Grand Canyon Superintendent M. R. Tillotson was forwarded for further study. Director Horace M. Albright sent Yellowstone Superintendent Roger Toll to evaluate McKee's suggestion. Toll recommended that two areas be established: Organ Pipe Cactus National Monument and Saguaro National Monument. This proposal for establishment of two new national monuments sent ripples of concern through Arizona ranching and mining circles. In consequence, establishment of the monument was delayed for five years while attempts were made to answer the concerns of the miners and cattlemen, who feared the impact on their livelihoods.

After the boundaries of the proposed monument were firmly established, President Franklin Roosevelt signed the proclamation for withdrawal of the land from the public domain, establishing the national monument on April 13, 1937. An excerpt from this proclamation reads as follows:

WHEREAS certain public lands in the State of Arizona contain **historic landmarks**, and have situated thereon various objects of **historic and scientific interest**; [emphasis supplied] and

WHEREAS it appears that it would be in the public interest to reserve such lands as a national monument, to be known as the Organ Pipe Cactus National Monument . . .

Thus, the proclamation clearly tells the National Park Service to serve the public interest by administering the monument in such a way that the "historic landmarks" and the "objects of historic and scientific interest" are cared for.

Relentless political pressure by cattlemen and miners persuaded congress to grant special concessions to their interests. The Gray Brothers (as related above) were given a permit in 1939 to continue their operations. Mining interests were able to plead their case on the basis of "national necessity" based on the increased world tensions that resulted in World War II.

Senator Carl Hayden wrote a bill in 1940 to restore unrestricted mining within the monument. A storm of protest came from conservation forces in Arizona and elsewhere. The Gila Bend Lions Club sent Senator Hayden a strongly worded resolution calling for changing Organ Pipe's status from a national monument to a national park, thereby keeping it closed to mining (Greene 1977). The National Park Service directorate failed to capitalize on this support. Instead, it proposed that Organ Pipe's status be changed to a National Recreation Area open to mining, ranching, collecting, and a variety of other exploitive uses. The directorate's proposal was included in the Hayden bill when it was introduced. The bill eventually failed to pass, partly because of conservationist opposition (Greene 1977).

The Hayden bill was reintroduced in 1941 without the status change to a recreation area, leaving Organ Pipe as a national monument. This bill, "To Permit Mining Within the Organ Pipe Cactus National Monument in Arizona (55 Stat. 745) was approved October 27, 1941, granting unrestricted mining within the monument.

The entire mining issue began to take on a Gold Rush atmosphere as prospectors gathered in Ajo. Monument Custodian Supernaugh wrote in his monthly report:

Prospectors are beginning to arrive in Ajo ready to go into the monument when the bill is signed permitting mining on the area. It looks as though there would be another gold rush down here. Considerable publicity has been given to this bill and I find many who expect to prospect in the monument do not realize that the area has been mined over 100 years without any findings of value (NPS, 1941).

Although a number of claims were staked and shafts sunk, no mineral deposits of economic size were located and Organ Pipe did not contribute any ore to the war effort. However, serious damage was done to monument resources and to the mission of the service. Greene (1977) aptly states:

Unrestricted prospecting and mining have plagued National Park Service personnel charged with protecting the monument since such development became permissible nearly four decades ago. By its existence, the law has compromised the work of the Park Service and provoked considerable confusion regarding the Service's mission at Organ Pipe Cactus.

In 1956 and 1957 (fide Hoy 1970a) the monument succeeded in purchasing two small claims in the Growler Mining District. Phelps Dodge challenged the right of the National Park Service to remove these claims from the public domain under the 1941 law. The Solicitor for Parks and Recreation in Washington



Figure 7a. View to the southwest looking toward Quitobaquito Pond. Photograph taken November, 1957, shows the U.S. Bureau of Animal Industry station established at Quitobaquito in 1949. The government built a low concrete dam at the nearby springs (see figure 9a and 9b) to form a pool so that water could be piped to the new station. This development was undertaken over Jim Orosco's objections. Jim Orosco apparently moved into this building after it was abandoned by the government. Note the two distinctively shaped mesquite trees to the right of the buildings for orientation (compare Figure 6a). The pond lies behind the station. A fig tree has been planted in front of the building (a tent frame) to the right. The foreground has been scraped bare as part of the "clean-up" effort. The National Park Service, in an ill advised effort to beautify Quitobaquito, razed these buildings in 1962 without undertaking any archeological work. [Photo James M. Eden, 11-4-57, monument files 334B].



Figure 7b. A view identical to Figure 7a, taken December, 1988, shows the dense mesquite bosque that grew from seed following removal of the Orosco cattle. The mesquites are crowding out the remaining graythorn and Parish Wolfberry (*Lycium parishii*) shrubs remaining from some time before when the ground was less shaded. There is no herbaceous cover; the ground is littered with cottonwood leaves. [Photo P. Bennett].

ruled in favor of the monument and Phelps Dodge withdrew in 1967. In 1967 the DeNiza Mining Corporation entered monument lands and "excavated more than 100 large pits simply to validate its claims there under the law," i.e. perform assessment work required to retain the claim. The firm filled in most of the holes before they left but the scars and some of the pits remain today. Greene (1977) says "the irreparable consequences of such an action are obvious and morally unexcusable." The mining law was repealed on September 28, 1976 by Public Law 94-429.

### **The Resources of Quitobaquito**

Preservation of the "minnows" that Lumholtz found splashing in Quitobaquito's waters, stimulated a drastic series of resource management actions by the National Park Service. When Robert Miller, an ichthyologist specializing in desert fishes, visited the pond in 1953, he found ecological conditions satisfactory. His photographs taken at this time show a shallow cienaga like pond. (See Figure 8) Pupfish thrived in shallow warm water and Miller noted that the population was ample (Miller & Fuiman 1987). Heavy livestock grazing pressure kept the Alkali Bulrush (*Scirpus olneya*) growing in and around the pond mowed down.

In 1961 Dr. Charles Lowe and Dr. H. K. Gloyd, both from the University of Arizona, found dramatically deteriorated conditions. Lack of ditch maintenance reduced water flow from the springs to the pond, creating low water conditions. The pond was filling with sediments washed in from the surrounding desert and pond storage capacity was becoming reduced at an alarming rate. Portions of the pond were now either dry or becoming too shallow for the fish (Lowe 1961). Late in 1961, the National Park Service initiated action.

Pond was drained and an unknown number of pupfish were captured for later reintroduction. No attempt was made to save any of the other aquatic life, including the Sonoran Mudturtle (*Kinosternon sonoriense*). Felger (in preparation, 1989) shows that there is a high probability that certain species of aquatic plants were lost. The drained pond was excavated to a depth exceeding the recommendation of Lowe and Gloyd. It was bulldozed to the bottom of the organic material layer which was presumed to be the depth originally reached by Dorsey in the 1860's. The dam height was increased during the deepening operation by piling up new material from the pond bottom.

NPS Biologist Steenbergh and Lowe tried to dissuade the superintendent from converting the warm, shallow pond into a deeper, cooler, and larger lake. Steenbergh and Lowe pointed

out that pupfish breed in shallow water and that creation of a deeper and cooler pool would create conditions well suited to non-native fish species (Steenbergh 1983). As a compromise, Superintendent Fitch agreed to leave a small shelf on the northeast portion of the pond. Otherwise the pond was excavated to a depth in excess of 1.5 m, too deep for optimum pupfish habitat (Lowe 1983).

In addition, the present overflow pipe and concrete spillway were constructed. The large leaning cottonwood tree on the southwest portion of the dam was undermined during the dredging operation and began to collapse, threatening the dam's integrity. The tree was (and still is) propped up by a 4 x 4 x approximately 6' brace which is normally just below the pond surface.

Taking advantage of the heavy equipment present at the site for the deepening of the pond, Superintendent Fitch undertook a cleanup operation. He wished to restore Quitobaquito's naturalness and to remove all evidences of human occupation during the past 100 years. In spite of strong advice to the contrary, he caused the historic adobe structures, some dating from the 1860's, to be razed and the site leveled. Jim Orosco's house on the north shore and the one on the bench above the pond were also razed. The large area where the corrals were was bulldozed and leveled. The immigration station was removed. Few artifacts were saved, the Orosco millstone being an exception. No archeological work was done and much information about man's past relationship with Quitobaquito was lost.

The harsh methods used to clean up the site created large areas denuded of vegetation, organic matter, and topsoil. Members of the Goosefoot family (*Chenopodiaceae*) are notoriously adapted for colonization of the most disturbed and saline type habitats. Thriving under these conditions, they form dense stands, outcompeting most other species. The bulldozed habitats around the old Orosco buildings and the 1962 parking lot today have a high percentage of plants in the family *Chenopodiaceae* (Figures 3, 4, 18).

The pond area was fenced and cattleguards added to exclude livestock. Walking trails were developed and a convenient pond-side parking lot constructed.

Development of Quitobaquito continued in the years that followed. Pit toilets were installed in 1974 in the mesquite bosque on the south side of the pond. The parking area was enlarged and interpretive exhibits installed. Quitobaquito became popular stop for tourists in the United States as well as Mexico. Benches were built on the shore, picnic tables and

garbage cans were provided beneath the cottonwoods on the north shore and informal nature trails began to appear.

Thomas Cox was hired in 1964 to study the pupfish and found that the vegetation removed from the pond bottom three years previously during the deepening was beginning to reappear and the water was becoming less muddy (Cox 1966). In past years, the coarse Alkali Bulrush which circumscribed the pond, the ditch, and the springs had been controlled by cattle and livestock grazing. At first, the Alkali Bulrush was welcomed as it caught the waterborne silt that had made dredging in 1961 necessary. However in a few years, they grew luxuriantly, smothering the pond, choking the ditch from the springs. On many occasions they filled this ditch so completely that water flow was effectively blocked between the springs and the pond. The bulrush growth was so dense and tall that the pond was blocked from view of the increasing numbers of annual visitors. To solve the problem the ditch was replaced by a buried plastic PVC pipe, which let the water through and deprived the reeds of much of their water supply. Unfortunately, this action also eliminated the unique biota that formerly inhabited the ditch (Cole and Whiteside 1965).

Biological consequences of the management actions of the early 1960's were not long delayed. The 1961 deepening had created a cool deep pond suitable for the survival of non-native species. In 1969, the Golden Shiner (*Notemigonus crysoleucus*), an alien species, was discovered in the pond (Steenbergh 1969). This fish is commonly used as live bait for fishing and was probably introduced by a "well intentioned" visitor (Minckley 1973). The close proximity of the parking lot and pond made such introductions easy. Pet turtles, domestic ducks, and palm trees were and are still often left by visitors (Peters 1979).

The shiner was a serious threat (Minckley 1973). The pupfish, having evolved in isolation, is disturbed and harmed by alien fish species (Miller 1981, Miller & Fuiman 1987). A panel of experts gathered, including representatives of the Arizona Game and Fish Department, university faculty, Fish and Wildlife Service, and the National Park Service to make recommendations for the eradication of the Golden Shiner were made. Large numbers of pupfish were removed from the pond and placed in adjacent holding tanks or in nearby manmade refugia at Williams Springs and Bates Well. The pond was drained and poisoned with rotenone to eliminate the Golden Shiner, then refilled and the pupfish reintroduced.

During pond drainage, about 100 mudturtles were found. Steenbergh observed that following the 1961 deepening that the Sonoran mudturtle had become increasingly rare in the area.

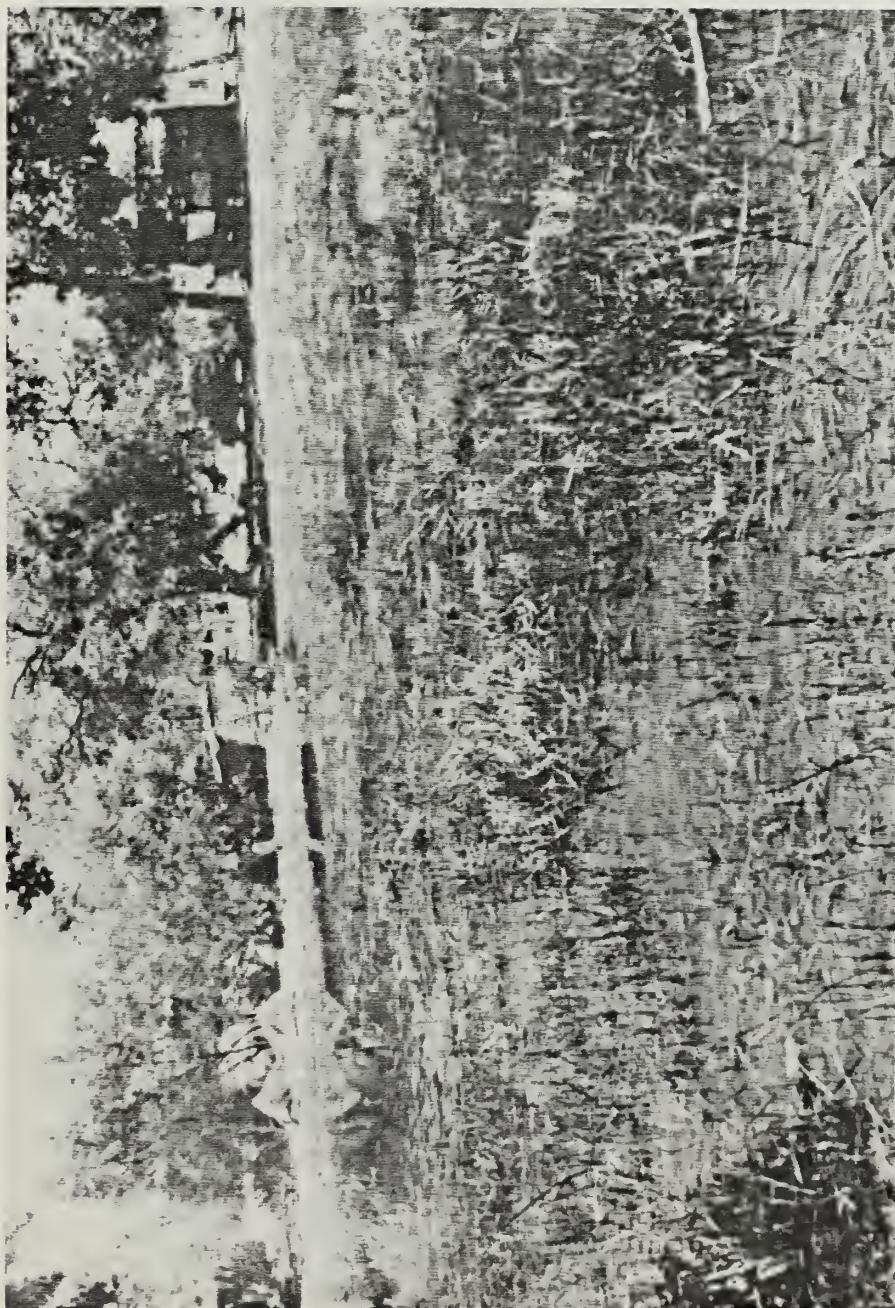


Figure 8: This photograph of Quitobaquito Pond was made by Robert Miller in 1953 when he first visited for the purpose of studying the Desert Pupfish (*Cyprinodon macularius eremus*). The view is to the north and was taken from dam. The Animal Industry buildings appear on the far shore. Open water and channels have been maintained in the Alkali Bullrush by livestock trampling and grazing. At this time the water was a foot or two deep. [Photo R. Miller].

He recommended that a representative population be placed in a refugium but again his recommendations were ignored. The superintendent decided that too much expense would be required to care for the animals during the protracted period of pond treatment (Steenbergh 1969, 1983).

In 1974, the pondside parking lot was abandoned and a new one constructed further from the pond at its present location. To prepare a seedbed and decrease compaction, bulldozers equipped with rippers scarified the old site. Unfortunately, this well intentioned activity tore through the site of a former Sand Papago encampment, damaging its archeological content. A new parking lot was graded further from the pond and remains in use (Plate IV). Tables and garbage cans were added to the picnic site at the and pit toilets were eventually relocated nearer the new parking lot.

In 1975, cattle grazing was entirely eliminated from the monument. The cattle fencing around the pond was no longer necessary and was removed (Peters 1979). Visitation by the public was becoming quite heavy and concern was felt about the impact of so many people. A "wildlife resting area" was established south of the pond as an attempt to restrict public access to what was thought to be an important breeding area and habitat for birds.

In 1979 the Park Service directed the Cooperative National Park Resources Studies Unit at the University of Arizona (CPSU/UA) to undertake the research necessary for the preparation of an interdisciplinary resource management plan. The pupfish refugia established in 1969 at Bates Well and Williams Spring were abandoned and the fish transferred to the Custody of Arizona State University.

The Desert Pupfish (*Cyprinodon macularius*) is given endangered status by the Fish and Wildlife Service. In 1987, Robert Miller published a taxonomic description of the Quitobaquito subspecies, naming it *Cyprinodon macularius eremus*, an allusion to the fact that this is the last viable population of the species left (Miller and Fuiman 1987). The underground pipe between the springs and the observation pool was renewed and a concrete lined ditch was constructed to carry spring water to the pond. This ditch preserves habitat for the unique microorganisms reported living in the spring outflow by Cole and Whiteside (1965).

## DISCUSSION

The vegetation remaining today closely reflects Quitobaquito's past. Two-hundred and fifty years of grazing have undoubtedly caused profound changes in species composition - palatable, slow growing, trample susceptible plants have been eliminated in favor of unpalatable, fast growing plants that have a high reproductive potential and protected perennating organs.

Mesquite, seep-weed, marsh fleabane, tarweed, saltgrass (*Distichlis spicata*), saltbush (*Atriplex polycarpa*), Triangle-leaf Bursage (*Ambrosia deltoidea*), and Alkali Bulrush meet one or more of these criteria and are the most common and dominant plants shown in the photographs of Quitobaquito (see Figures 3, 5, 18).

Aggressive non-native species have been introduced since Kino's time, most have been unable to establish dense stands except in the moist disturbed habitats. Pandemic weeds find desert living conditions too harsh without human assistance. For example, Bermuda grass (*Cynodon dactylon*) occurs in scattered damp areas around Quitobaquito, but it is always very local and shows no tendency to spread (Figure 9). Another example: *Salsola kali* (tumbleweed) is extremely aggressive and has colonized much of North America but has failed to become established at Quitobaquito except in bare, continually disturbed sites in the wettest years. *Schismus barbatus*, a small annual grass, is an exception since it grows densely over extensive tracts of arid desert.

The upshot of 250 years of unremitting grazing pressure and selection of hardy species at Quitobaquito has been the formation of a coarse-grained mosaic of vegetation types. Each hardy species is able to outcompete all others on certain patches of ground, creating dense stands (Figure 3, 6, 7, 13, 18). Whether colonization of these sites in such a manner is owed to the availability of particular optimum habitat or due to accidental or random events (such as years of higher than normal precipitation favoring certain species) is unknown. The effect is a lack of plant species diversity, leading to uniform simple habitats and lower than expected vertebrate species diversity.

Johnson, Brown, and Goldwasser (1983) found that the vegetation on the north edge of the pond has significantly greater species diversity and a greater variety of habitats than on the south. This diversity attracts a greater number of bird species than does the low diversity mesquite bosque to the south.

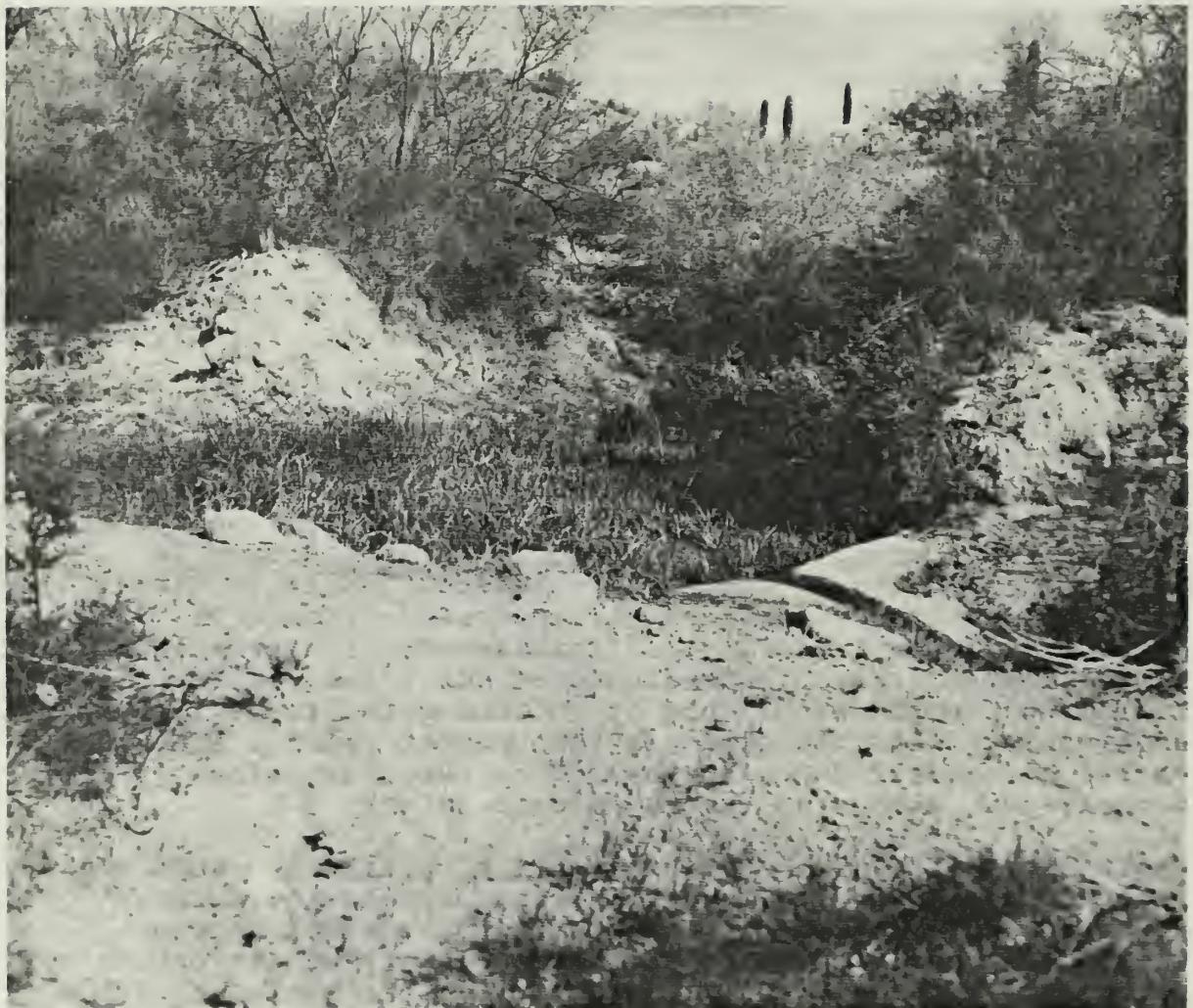


Figure 9a. Photograph shows the southeast spring condition on February 23, 1961, when all of the Orosco cattle had been removed for five years but the Gray brothers cattle were still grazing in the spring head, keeping the Alkali Bullrush in control. The low concrete dam (right center) was installed in 1949 by the government to create a pool so that water could be piped to its installations near the pond. Quitobaquito Spring in reality has multiple seeps lying along the base of the Quitobaquito Hills. At present only two spring heads have sufficient water to warrant collection for piping to the pond. The southeast spring is the one with the most flow and is the one shown in these photographs. View is toward the northwest. [Photo Budge, monument files W-25].



Figure 9b. Photograph of southeast spring taken December 11, 1988. The girl is standing on top of the government dam. Alkali Bullrush must be grubbed out of the spring and ditch periodically. If it is allowed to grow unchecked, water flow may be reduced by as much as 70%. Vegetation composition has changed little in the 28 years since the upper photograph was made. Some of the mesquites to the left of the spring are gone and a seep-willow (*Baccharis salicifolia*) has replaced the graythorn at the back. Note the growth of the saguaros. [Photo P. Bennett].



Figure 10a. View looking southwest from the southeast spring. Quitobaquito pond lies beyond the cottonwood trees in the center of the photograph. Photograph, taken on August 23, 1963, shows the outflow from the spring shown in figures 9a and 9b. Grazing has apparently been eliminated. The spring ditch has been dig out with a road grader, probably to eliminate the Alkali Bullrush and increase water flow. [Photo H.T. Coss, monument files W-37].



Figure 10b. View looking southwest from the southeast spring. Photograph was taken on December 11, 1988. Grass and Alkali Bullrush cover had increased greatly. *Elymus rostellata*, Alkali Bullrush, and *Juncus balticus* form a nearly closed stand. Tarweed, *Lycium parishii*, and graythorn are colonizing moist soil. [Photo W. Bubul-Bennett].



Figure 11a. View of the pond vegetation from the north shore of Quitobaquito Pond. The large cottonwood tree growing on the dam also appears in Figures 11, 12, 13, 14, 16, etc. Photograph was taken on December 9, 1950. Considerable open water is visible between the Alkali Bullrush plants. Shore vegetation is relatively open. The pond and surrounding vegetation is being grazed. [Photo Wm. Supernaugh, V. Dunn, Barton, monument files W-10].

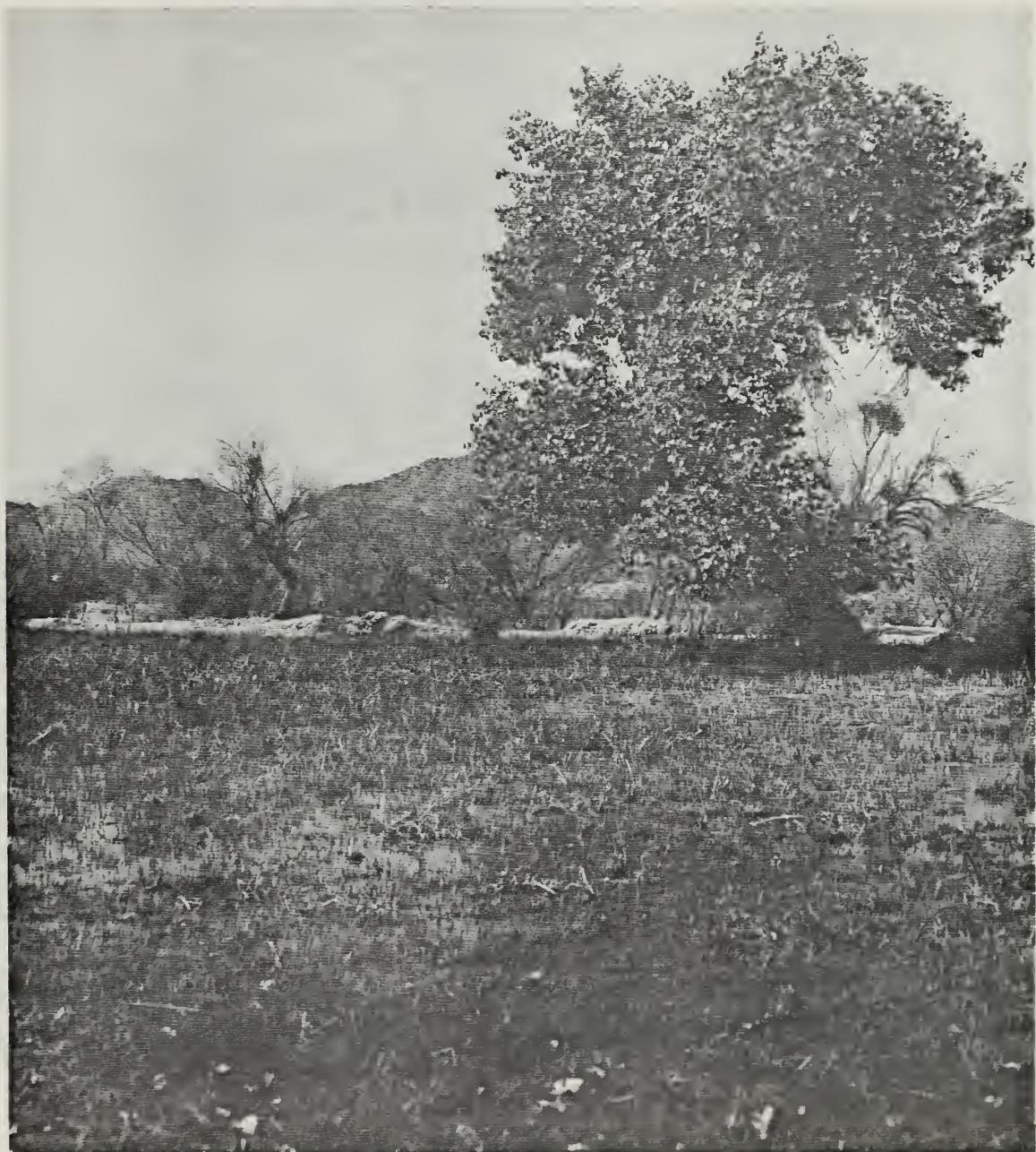


Figure 11b. View of the pond vegetation from the north shore of Quitobaquito Pond. Photograph was taken on April 19, 1956, three years after Figure 8 and five years after the photo in Figure 11a. This depicts what the pond looked like at the end of the Orosco era. Grazing and trampling have kept the Alkali Bullrush under control. The pond is silting badly as sheet erosion from the uplands fills it. [Photo Davis, monument file W13].



Figure 12a. View of Quitobaquito Pond looking toward the southwest. Photograph, taken on February 16, 1957, shows a dramatic increase in the growth of the Alkali Bullrush compared to Figure 11a. There is a narrow strip of open water remaining along the dam. Everywhere else the pond is invaded by a closing stand to Alkali Bullrush. Cattails (*Typha spp.*) formerly present, have been eliminated by competition at Quitobaquito. Views like this prompted Lowe and Gloyd to recommend deepening of the pond. [H. Parent, monument files W-14].

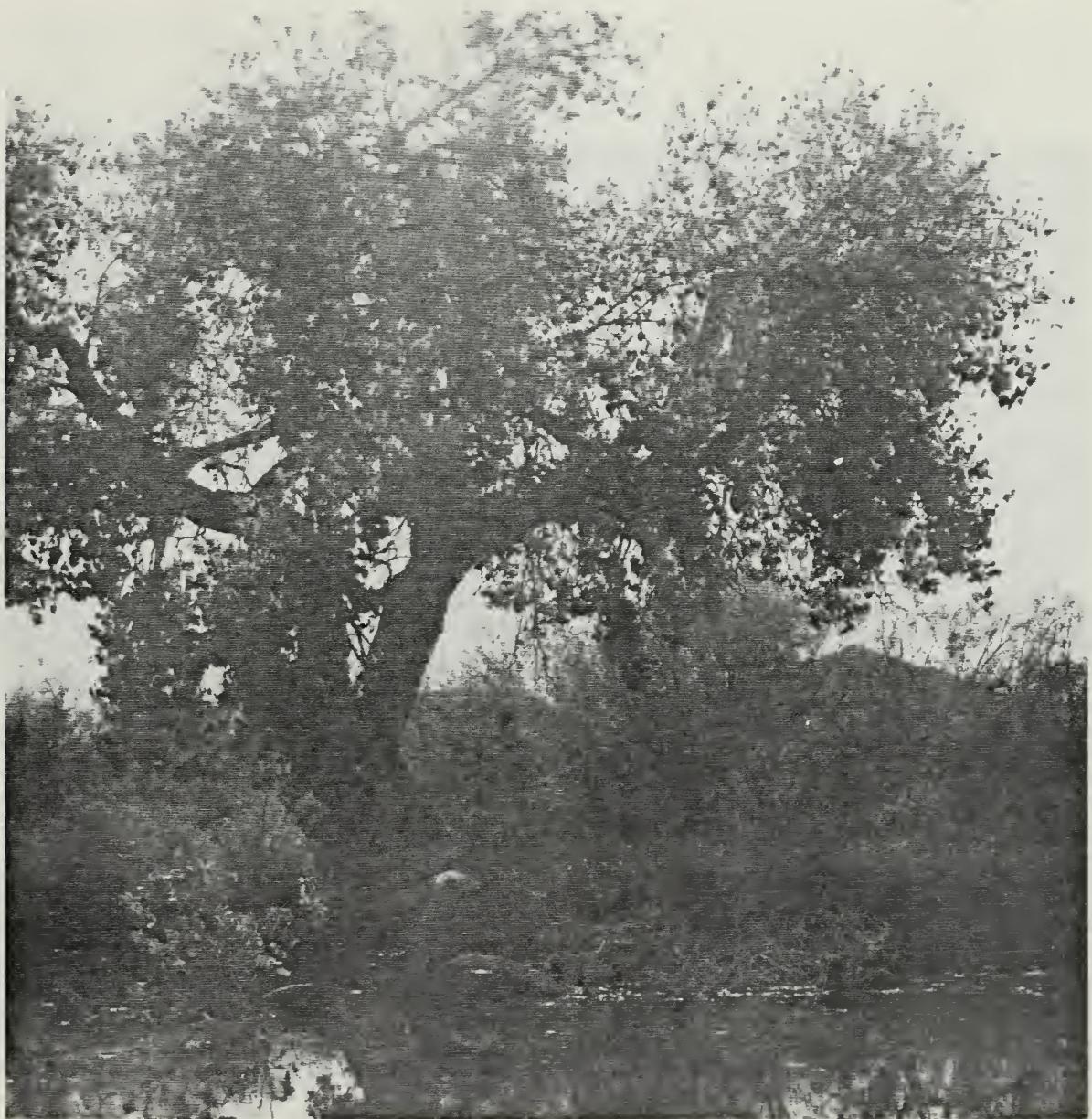


Figure 12b. View of Quitobaquito Pond looking toward the southwest. Photograph was taken on December 11, 1988. The pond was excavated in 1961. The water in the foreground is 4-6 feet deep. Algae, *Potogameton* sp., and *Chara* sp. are floating on the surface of the water. Note how much the tree is leaning in comparison with Figures 11a,b and 17a,b. During the excavation a prop was placed beneath the trunk (see figure 16b). There is concern that, should this prop fail now, the pulling of the roots as the tree falls could compromise the integrity of the dam. [Photo W. Bubul-Bennett].



Figure 13a. View of Quitobaquito Pond looking east-southeast. Photograph, taken on February 16, 1957, shows the conditions prevailing immediately after acquisition by the Park Service. The Alkali Bullrush in the pond are quickly forming a closed stand (See Figure 12a). Pondside vegetation remains quite open; birds and animals may come to water with some concealment but without breaking through brush. Foreground shrubs are mesquite, *Atriplex* spp, Berlandier Wolfberry, and whiteleaf bursage (*Ambrosia dumosa*). [Photo H. Parent, monument files W-15].



Figure 13b. View of Quitobaquito Pond looking east-southeast. Photograph, taken December 11, 1988 records dramatic vegetation changes. The crown of the southshore cottonwood can just be seen behind the mesquite in the center of the picture. Foreground shrubs are *Atriplex* spp. and Berlandier Wolfberry. The impenetrable thicket, extending 50 feet to the pond is mesquite, Parish Wolfberry, Anderson Wolfberry (*Lycium andersonii*), and graythorn. Cover is so dense that it is little used by large mammals such as deer. Killdeer and other wading birds have been essentially eliminated by the dense cover and vertical pond banks. [Photo P. Bennett].



Figure 14a. View of Quitobaquito Pond looking toward the west. Photograph, taken in August, 1957, during the summer rains, shows the pond unusually full. The heavy growth of Alkali Bullrush in the area normally wetted can be seen along the far shore. There was some use being made of the pond for stock watering as evidenced by the tracks in the foreground mud. The east shore is very shallow because sediment is washing into the pond from nearby higher ground. This shallow water would have been made quite warm by the summer sun. This is acceptable habitat for the desert pupfish but not for most other species. Note relatively upright posture of cottonwood on far shore and the relatively open shoreline in the foreground and background. [Photo J.M. Eden, Monum. files W-17a].



Figure 14b. View of Quitoquito Pond looking toward the west. Photograph, taken on December 11, 1988, is made from a point 15 feet north of Figure 14a view. Original photo point is now on the new dam and covered by dense growth. Compare with Figure 14a view to see how the pond margin is now closed off by mesquite, other shrubs, and Alkali Bullrush. [Photo W. Bubul-Bennett].



Figure 15a. Photograph shows heavy equipment used to deepen the pond. Heeding the recommendation of Lowe and Gloyd, the Superintendent ordered deepening of Quitobaquito Pond. Late in 1961, the Park Service drained the pond and began excavation. The pond was dug to a depth of 4-6 feet, replacing the warm shallow pond with a relatively cooler lake. A low bench 5 feet wide along a portion of the north shore was the only shallow habitat that remained. Ignoring Steenbergh and Lowe's advice no effort was made to salvage the Sonoran Mudturtles native to the pond. They were left to die. The formerly gently sloping banks were left vertical after excavation, interfering with the ability of any turtles that survived to haul out onto land for nesting purposes. Failure to provide suitable habitat for the pupfish and the turtles would have severe consequence in the future. The soil removed was trucked away or dumped near the north and south edges of the pond. [Photo Steenbergh, 1-62, monument files W 32c].

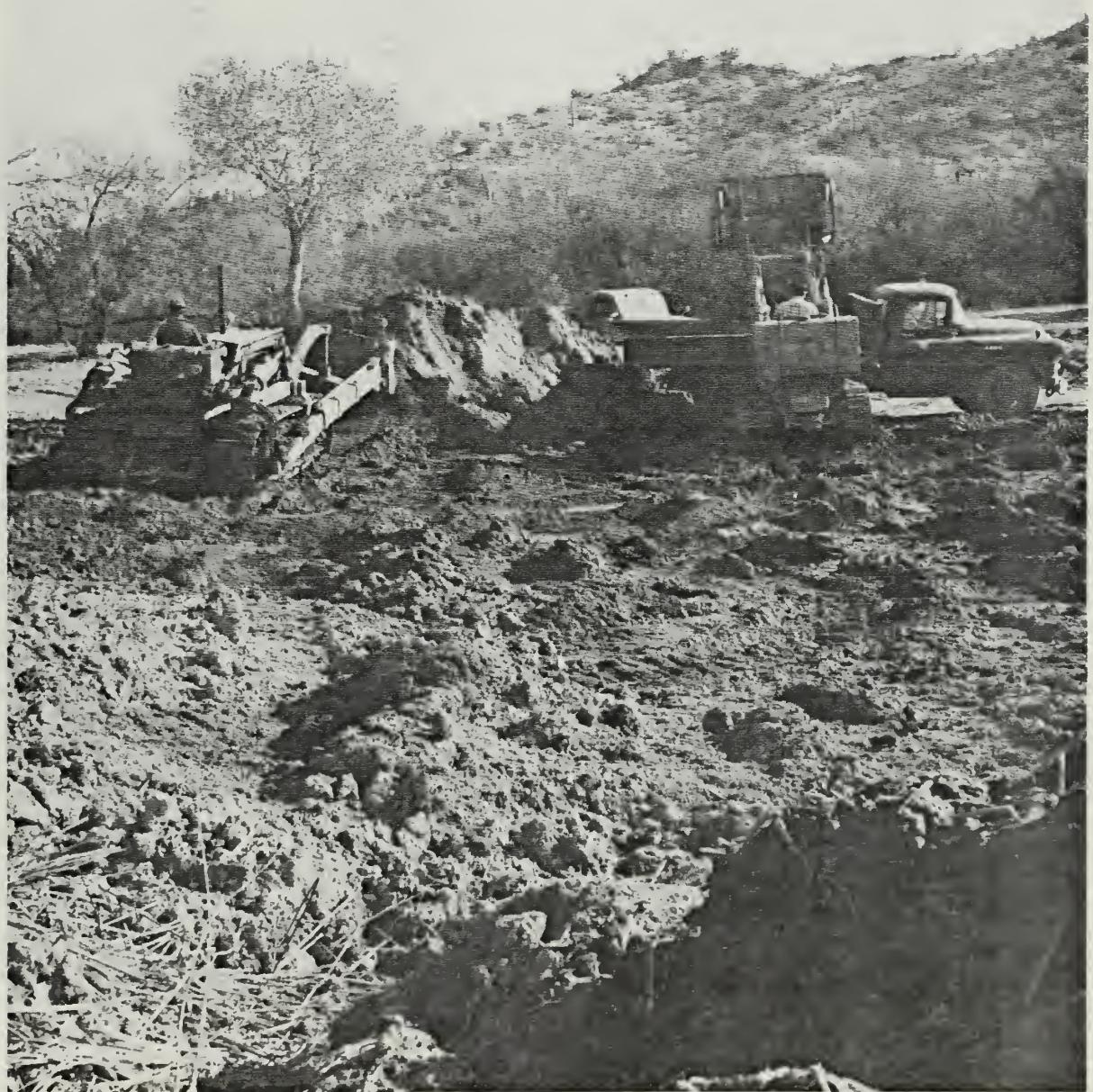


Figure 15b. Photograph shows excavated soil being loaded into a dump truck for removal. The pond was dug down to white sandy soil which was presumed to represent the original bottom surface. [Photo Steenbergh, 1-62, monument files W 34e].



Figure 16a. View of the large cottonwood growing on the Quitobaquito dam. Photograph depicts the excavation operation in the vicinity of the large cottonwood tree on the dam. As the pond bottom was dug down and the earth removed beneath it, the tree on the old dam collapsed had to be propped up for fear that pulling by the roots would result in dam failure. [Photo Steenbergh, 1-62, monument files W-34a].



Figure 16b. Photograph, taken in 1969, shows the wooden prop placed beneath the collapsing cottonwood tree during the 1961 excavation. Since the prop was originally placed, the tree has continued to grow and gain weight. How long this prop will last is problematical. Failure of the prop will place the integrity of the dam in jeopardy. [Photo Begeman, monument files Q-23].



Figure 17a. Photograph shows the old cottonwood tree, growing on the Quitobaquito dam several years prior to the 1961 pond excavation. Note the angle of the trunk in relation to the pond surface. This tree poses a serious threat to the integrity of the dam. [Photo J.M. Eden and F.H. Jacot, 8-21-1957, monument files B-59].



Figure 17b. Photograph shows the old cottonwood tree, April 28, 1966, after digging down the pond bottom allowed it to collapse. Note the angle of the trunk in relation to the pond surface and compare with the Figure 17a photograph. It would have rested completely on the pond bottom if the workmen had not propped it up with 4x4 timber. Should this prop collapse, there is danger that the tree roots would pull away enough of the dam fabric to cause it to fail and drain the pond. [Photo H.T. Coss, 4-28-1966, monument files B-58].

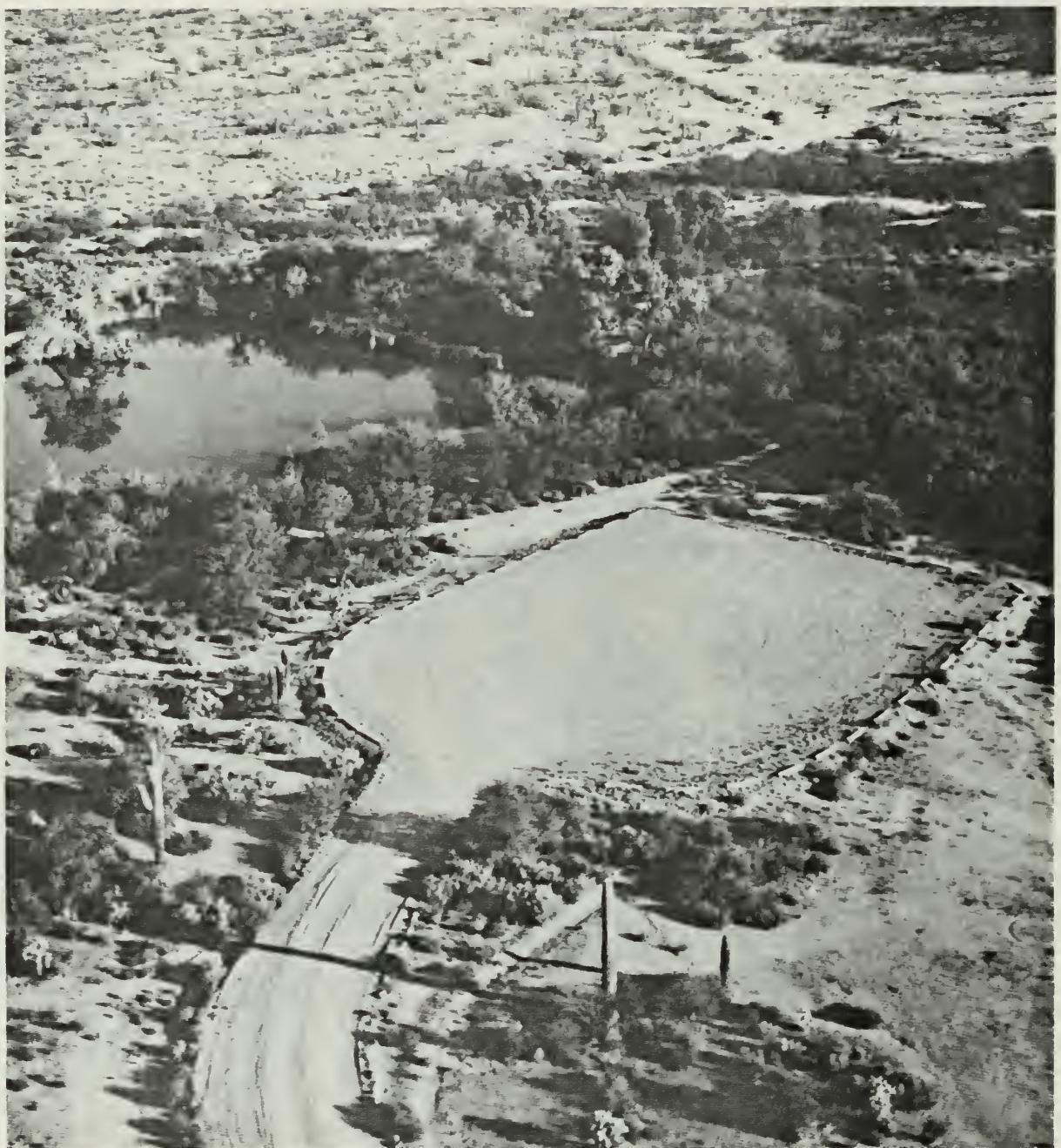


Figure 18a. View of visitor parking lot at Quitobaquito Pond. Photograph taken in April 1968 shows an aerial view of the pond and parking lot. The lot constructed in 1962 was quite close to the pond, allowing drive up access. We believe that this convenient access encouraged visitors to release pet turtles and bait fish such as the Golden Shiner into the pond. Palm trees and domestic ducks have also been found in the area. [Photo Begeman, monument files W-46].



Figure 18b. Photograph taken on December 11, 1988 shows the 1962 parking lot as it appears today from ground level. The lot was abandoned and attempts at revegetation were begun in 1974. Parking was moved further from the pond at the same time. Unfortunately, the 1962 construction and the 1974 restoration disturbed and damaged archeological evidence of occupation by the O'odham people long resident at this site. The trees in the background are the cottonwoods on the north shore of the pond. Since the parking lot was moved to a more distant location, the introduction of exotic species has been greatly reduced. This rather dry site, whose topsoil had been bladed away, was slow to recover. Some cholla cactus (*Opuntia fulgida*) and saltbush (*Atriplex* spp.) were planted to cover the scars but significant recovery did not begin until 1982 when three years of heavier than normal rainfall permitted establishment and survival of numerous young plants. Seep-weed are forming a closing stand and may completely replace the saltbush. [Photo W. Bubul-Bennett].



Figure 19a. Photo shows the portable pump which began drafting from Quitobaquito Pond on December 8, 1969. The water removed was discharged into the old acequias used to cultivate the Orosco crops, eventually flowing into "Supernaugh's wash." Biological consequences of the management actions taken in the early 1960's were not long delayed. The 1961 deepening had created a cool deep pond suitable for the survival of other species. In 1969, the Golden Shiner, an non-native species, was discovered in the pond (Steenbergh 1969). This fish is commonly used as live bait for fishing and was probably intentionally introduced by a visitor. The close proximity of the parking lot and pond made such introductions easy. A panel of experts was assembled to make recommendations for elimination of the shiner. The pond needed to be drained and poisoned. [Photo Begeman, monument files Q-2].



Figure 19b. This is a photograph taken on December 11, 1988 from the same location as Figure 19a. The old ditch can be faintly seen running through the center of the photograph. Since 1969, mesquite, graythorn, Anderson Wolfberry, and Parish Wolfberry have formed a steadily closing impenetrable thicket at the site. In the few openings remaining saltgrass, brickellia, and tarweed lead a precarious existence. In the foreground right, note the remnants of Alkali Bullrush remaining from times before the mesquite bosque out competed other moisture loving vegetation. [Photo P. Bennett].



Figure 20a. Photograph shows Arizona Game and Fish employees seining Desert Pupfish from Quitobaquito Pond on December 9, 1969. As the Quitobaquito Pond was drained (See Figure 18a), a number of desert pupfish were seined from its receding waters. The exotic Golden Shiner was left to die. The pupfish were held in large tanks after they were caught. After the pond was poisoned and allowed to dry out (killing all Golden Shiner fish and eggs) the pond was refilled and the pupfish reintroduced. Again, no provision was made to save any of the native turtles in the pond. Note the vertical bank that prevents turtles from climbing from the pond for nesting. [Photo Begeman, monument files Q-21h].



Figure 20b. Photograph was taken on December 9, 1969. Quitobaquito pond has been completely pumped out. Arizona Game and Fish employees are seining out the last of the Desert Pupfish to be salvaged. The pond bottom and banks were sprayed with a strong rotenone solution. Then the pond was allowed to dry out for several weeks before the spring flow was allowed to begin the filling process. None of the Golden Shiners survived this treatment. The Alkali Bullrush have formed an impressive and impenetrable stand along the north shore. The salt crust on the plants marks the pond level. [Begeman, monument files Q-7].



Figure 21a. Photograph shows the source of Aguajita Spring, December 9, 1950. The picture was taken very near the International Boundary looking to the north. Heavy cattle grazing in the area prevented vegetation growth in the drainage. Aguajita Spring provided water for Levy's trading post located here, and for the Gray brother's corral nearby. The spring and wash are also of interest because Lumholtz (q.v.) observed fish in a drainage at or near Quitobaquito. The drainage he mentions has never been identified with certainty but may have been Aguajita Wash/Spring or else "Supernaugh's wash." Neither drainage carries enough water today to support a fish population. [Photo Supernaugh and Dunn, monument files W-6].



Figure 21b. Photograph of Aquajita Spring taken December 11, 1988. Until heavy summer floods in 1988 scoured the area, this spot was an impenetrable tangle. Note the presence of tamarisk, an exotic species, at the extreme right. Cattails *Typha* spp. were reported from Quitobaquito and Aguajita Spring until 10 years ago. They are still absent or dormant at Quitobaquito, but have become active again at Aguajita following the flood. This species may depend on disturbance and be unable to compete in climax communities at desert waterholes. [Photo P. Bennett].

Intense grazing of desert plants often causes severe erosion. Although there has been considerable erosion at Quitobaquito, it has mostly been sheet erosion (Figure 3 & 11). The downcutting of the Rio Sonoyta, which began in 1891 (Hoy 1970b) and lead to the abandonment of the old Sonoyta townsite, has entrenched the riverbed 3-5 m opposite Quitobaquito. Normally, tributaries to a downcutting stream also downcut. Aguajita Wash and Supernaugh's wash (Figure 3) would likely have head cut into the Quitobaquito area but were stopped by the Mexican Highway 2 culverts, down stream from that area. The highway was constructed before the Rio Sonoyta tributaries eroded headward into the monument and the highway's culvert system is artificially established and maintains the stream gradients at pre-1900's levels.

Quitobaquito's historical resources have been severely damaged. Figure 4 shows the area occupied by the Orosco family for 80 years and Figure 7 shows some of the material culture that Jim Orosco removed from his parents home. We can only wonder if these objects might have shed light on the process of accommodation required of O'odham people as they interfaced with the Anglo culture. Why did the Indian people leave Quitobaquito periodically? It would be nice to know more about the level of competition between the store keepers and how they attracted trade. Why did Levy move to Aguajita? What was the economic basis of Dorsey's trade with the Indians? These questions and many others likely never be answered because the evidence was either bulldozed into oblivion, removed by unauthorized individuals, or discarded to restore naturalness to the area.

When Andrew Dorsey arrived in the mid-1860's, he found 250 Indians living in the area. Although they may have had some cattle, horses, goats or sheep, we may assume that they were living much as they always had; on subsistence agriculture. Dorsey however developed a store, a pond, and a town. We know that Dorsey had stock because he imported goods from Caborca, which required teams to haul these goods. We may further assume that Dorsey ate beef rather than feral burros. Cattle were surely present. Dorsey was not living by means of subsistence agriculture - in part he was a trader. What goods did he trade? What did the Indians have of value to trade with? We don't know; it could have been cattle, hides, skins, maze, or even gold. Whatever the trade goods were, extraction of them from the land partly removed the Indians from subsistence agricultural pursuits and moved them into extractive subsistence. In terms of units of alteration of the landbase, extractive activities use more units than subsistence. In effect, Dorsey's business affected a much wider area than Quitobaquito.

Next we find the Orosco family in residence and also the Levy store, Jeff Milton, Tom Childs, John Merril, and Rube Daniels. History is silent about most of their daily lives. Hornaday suspected that Rubin Daniels wasn't too stable after the ammunition incident at Quitobaquito. He had trouble with both Daniels and Milton on their trip to the Pinacate (Hornaday 1908). Jeff Milton, who was functioning as a border patrol agent, didn't think much of Orientals (we don't know what he thought of Indians). Tom Childs was applying White values while relating to the Indians inspite of being married to a O'odham woman. It seems certain that each culture at Quitobaquito was seeking different ends by different methods. Probably the Whites moved the Indians away from the best sites at Quitobaquito or took the best fields.

Under these circumstances, the Oroscos likely felt no sense of permanence there. Daniels told Hornaday he, Daniels, was just waiting for his main chance in life to move along also. The Gray brothers owned some property but not at Quitobaquito - in later years their operation was on a year to year basis with no prospect of passing anything on to their heirs. None of these people - Dorsey, Levy, Milton, Childs, Daniels, Merril, or the Grays - had a vested long term stake in Quitobaquito - there is no evidence that it represented anything more than a convenience or utility for short term gains. The Oroscos probably felt differently about the place, but they were surely in no position - not socially - not culturally - not economically - to strongly influence the management of Quitobaquito.

## CONCLUSIONS

The United States Government has always treated Quitobaquito with a mixture of altruism, avarice, and accommodation. For years, when the government wanted to build a facility along the border, Quitobaquito was the site of preference - be it a port of entry, an immigration, a border patrol or a livestock inspection station. It has a dependable water flow - the only such place between Sonoyta and Yuma. None of these facilities was permanent and none of them contributed significantly to its integrity or stability.

The problems at Quitobaquito come from too many people caring in too many different ways -- there is confusion of vision about what Quitobaquito was, is, or should be. The existing philosophical basis for the National Park Service is broad, open to interpretation, and often in conflict with itself. What kind of ethical message did Congress send to the

Park Service when on one hand it charged it with protecting "historic landmarks" and "various objects of historic and scientific interest" and on the other it legislates unrestricted mineral entry? Where is the logic in violating Jim Orosco's right to graze his cattle in Mexico and cause him to cease grazing when the Gray Brothers are permitted to continue ranching and allowed to substantially exceed their permitted stocking level?

So many people and organizations with so many motives have affected Quitobaquito's fate in so many ways that little of the original fabric remains. Its early inhabitants utilized its limited resources for survival and had a sustained yield management philosophy consistent with that necessity. The later entrepreneurial residents sought maximum yield rather than sustained yield and had no interest in Quitobaquito's long-term future. National Park Service employees bring a still different management philosophy, that of personal satisfaction (Hartzog 1988). Park employees were interested in Quitobaquito's hereafter but often their vision was highly personalized.

Maximum yield, sustained yield, and personal satisfaction philosophies are not necessarily compatible. The National Park Service undertook a difficult task when it took over Quitobaquito. Its philosophical and land management biases resulted in inconsistent and opportunistic actions based on individual values and perceptions rather than on an environmental ethic. Today at Quitobaquito we see the results of the tension between these attitudes.

Unfortunately, the pitfalls of managing the complex problems at Quitobaquito on the basis of a personal satisfaction philosophy were not foreseen. The significance of Quitobaquito's rich and diverse cultural history and its effect on the natural environment escaped the National Park Service during the early years. Greene (1977, p. 69), in the context of discussing purchase of two inholdings (Long Valley and Quitobaquito) by the government within the monument, states the case succinctly:

Yet the aftermaths of these transactions were marked by reprehensible management decisions so far as they concerned the cultural resources at both sites. By 1958 the Long Valley and Orosco [Quitobaquito] properties belonged to the National Park Service. The abandoned sites were strewn with litter, although historical structures still stood at both locations. Despite protests from scholars and history enthusiasts over the

propriety of such action, Superintendent Monte Fitch<sup>9</sup> ordered the former Orosco property at Quitobaquito razed. At least one of the old buildings at the pond was present when the first Orosco settled there in 1887. Nevertheless, it succumbed to the bulldozer along with other structures. At the same time the pond was deepened and the dike reinforced. By this capricious decision the Quitobaquito site was stripped of most of its historical and ethnological integrity.

The natural resources were also roughly handled. When the pond became so shallow that the native pupfish were in danger, a superintendent ignored professional advice and relied on his individual values when applying a remedy to the problem. The measures taken went too far, creating even more severe ecological problems nine years later.

Management could not decide what Quitobaquito was to be: a historical site, a bird refuge, or a picnic ground. Some managers had one vision, some another. In the end, well intentioned management, lacking continuity, contrived to severely damage both the cultural and natural resources of Quitobaquito.

When Organ Pipe Cactus National Monument was established, ranching and mining interests sought to strip away the protection provided by monument status under the law. We can understand why the commercial interests acted in accordance with their maximum yield philosophy and in what they viewed as their best interests. What defies logic, in retrospect, is why the managers of the National Park Service actively sought to diminish the monument's legal protection, assist the commercial interests, and act contrary to the organization's conservation ethic.

Managerial promotion and career enhancement depend on supervisory "perceptions" in the short term more than on a long term conservation ethic. The superintendent who ignored professional advice when he ordered the pond deepening in 1961 was long gone when the consequences of that action became apparent in 1969. Current National Park Service customs permit and even encourage superintendents and other resource managers to exercise personal judgement and to use perceptions and political realities as well as facts when doing their jobs. Like the rest of us, these people make decisions based on personal values. That these values differ greatly from one individual to another and result in inconsistent programs, apparently causes little agency concern, provided that unfortunate consequences are safely delayed. Today's

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<sup>9</sup>A list of the Superintendents of Organ Pipe Cactus National Monument and their dates of tenure appears in the Appendix.

superintendents face a daunting array of non-science problems that will have immediate affects on park operations. The affects of natural resource decisions, good or bad, are often delayed beyond the individual's incumbency while other realities are faced.

Organ Pipe Cactus National Monument had three superintendents between the time that Monte Fitch deepened the pond and Matt Ryan had to deal with the Golden Shiner infestation. The disparity between the time of a superintendent's tenure and the time it takes for his resource decisions to make themselves felt makes effective performance evaluation difficult. The system is more likely to reward its managers for decisions based on short political "realities" than on long range ecological program effectiveness. That the end result is confusion or conflict causes little official consternation or remedy.

Greene (1977) singles out Superintendent Fitch for some harsh criticism. In fairness, many others participated in confused management Quitobaquito - every one had a different concept of what the place should be - its management seemed to become a test of leadership and authority and the establishment of a totally new direction, undoing past efforts, seemed to be the mark of success. Each manager undertook a vigorous short term program and reported the short term results to headquarters. Until 1979, no manager evaluated the long term effects of all of this management.

A key element that will contribute to a brighter future of Quitobaquito is continued improvement in the quality and sensitivity of the resource managers and administrators at Organ Pipe and elsewhere in the National Park Service. The Park Service is making some progress toward establishment of resource management as a professional career and toward holding superintendents responsible for the long term condition of the natural resources which they administer.

The present (1989) direction and staffing at Organ Pipe is a model that other National Park Service areas could profitably emulate. Organ Pipe Cactus National Monument devotes more of its human and fiscal resources toward resource management than most, if not all other, National Park Service units. This same administration has played a key role in designation of the monument as a Biosphere Reserve under UNESCO's Man and the Biosphere Program, an effort to foster a wise relationship between human harvest and ecosystem integrity. Also it has cooperated with the CPSU/UA in an ambitious project (Sensitive Ecosystems Program) to evaluate environmental conditions monument wide. This bodes well for the future of Quitobaquito and the Monument.

## LITERATURE CITED

Anderson, K. M., F. Bell, and Y.G. Stewart. 1982. Quitobaquito: a Sand Papago cemetery. *The Kava* 47(4):215-237.

Appleman, R.E., and R. Jones. 1969a. Blankenship Ranch. Historic Structures Reports, Parts I and II. Organ Pipe Cactus National Monument, Arizona. Washington, National Park Service Office of Archeology and Historic Preservation. 64 pp.

Appleman, R.E. 1969b. The Victoria Mine. Historic Structures Report, Parts I and II, Organ Pipe Cactus National Monument, Arizona. Washington, National Park Service Office of Archeology and Historic Preservation. 43 pp.

Bell, F., K.M. Anderson, and Y.G. Stewart. 1980. *The Quitobaquito Cemetery and Its History*. Tucson, Arizona: National Park Service, Western Archeological and Conservation Center. 149 pp.

Bolton, H.E. 1948. *Kino's Historical Memoir of Pimeria Alta*. Berkeley: University of California Press 2 vols in 1. 329 pp.

Bolton, H.E. 1984. *Rim of Christendom: A Bibliography of Eusebio Francisco Kino, Pacific Coast Pioneer*. New York: Macmillan, 1936; Reprint, Tucson, Arizona: University of Arizona Press, 1984. 644 pp.

Bryan, K. 1925. *The Papago Country, Arizona*. Washington: Government Printing Office. 436 pp.

Castetter, E.F. and R.M. Underhill. 1935. The ethnobiology of the Papago Indians. *Univ. New Mexico Bull Ethnobiol Stud Am Southwest, Biol Ser* 4(3):84 pp.

Chapman, C.E. 1915. Preliminaries of the Spanish Advance from Sonora to California, 1687-1773. PhD dissertation, Univ of California, Berkeley. 220 pp.

Cline, H.F. 1963. *The United States and Mexico*. Cambridge, Harvard University Press. 484 pp.

Cole, G.A. and M.C. Whiteside. 1965. An ecological reconnaissance of Quitobaquito Spring, Arizona. *Journal of the Arizona Academy of Science* 3:159-163.

Conkling, R.P. and M.B. Conkling. 1947. The Butterfield Overland Mail, 1957 - 1869; Its Organization and Operation Over the Southern Rout to 1861; Subsequently Over the Central Route to 1866; and Under Wells, Fargo and Company in 1869. 412-46, 3 vols. Glendale, California: Arthur H. Clark Company.

Cook, C.A. 1967. "A Documentation of the Arizona Papagueria with Special Reference to the Organ Pipe Cactus National Monument." Organ Pipe Cactus National Monument, Arizona. Unpublished m.s. 377 pp.

Coues E. 1900. On the Trail of a Spanish Pioneer; the Diary and Itinerary of Francisco Garces in His Travels Through Sonora, Arizona, and California, 1775-1776. New York, Francis P. Harper, 2 vols. 608 pp.

Cox, T.J. 1966. A Behavioral and Ecological Study of the Desert Pupfish (*Cyprinodon macularius*) in Quitobaquito Springs, Organ Pipe Cactus National Monument. PhD dissertation, University of Arizona. 94 pp.

Davis, J.H. 1957. Organ Pipe Cactus National Monument: A Study of Conservation Objectives Relating to its Establishment, Boundary Adjustments, and Private Interest in the Area. Unpublished manuscript in park files. 21 pp.

Eden J.M. 1956. A History of Organ Pipe Cactus National Monument, Arizona. Unpublished manuscript, Organ Pipe Cactus National Monument. 24 pp.

Ezell, P.H. 1983. History of the Papago. In: Ortiz A [ed.], 1983, Handbook of North American Indians, Washington, DC, Smithsonian Institution. 10:149-160

Felger, R.S., P. Warren and S. Anderson. In preparation. Flora of Quitobaquito.

Fontana, B.L. 1983. History of the Papago. In: Ortiz A [ed.], 1983, Handbook of North American Indians, Washington, DC, Smithsonian Institution. 10:137-148

Forbes, R.H. 1952. Crabb's Filibustering Expedition into Sonora 1857. Tucson: Arizona Silhouettes. 60 pp.

Gray A.B. 1963. The A.B. Gray Report, and Including the Reminiscences of Peter R. Brady who Accompanied the Expedition, ed. L.R. Bailey. Los Angeles, Westernlore Press. 240 pp.

Greene, J. 1977. Historic Resource Study, Organ Pipe Cactus National Monument, Arizona. Denver, Colorado, National Park Service, Denver Service Center, Historic Preservation Division. 205 pp.

Hackenberg, R.A. 1983. Pima and Papago ecological adaptations. In: Ortiz A [ed.], 1983, Handbook of North American Indians, Washington, DC, Smithsonian Institution. 10:161-177.

Haley, J.E. 1948. Jeff Milton: A Good Man With a Gun. Norman: University of Oklahoma Press. 398 pp.

Hornaday, W.T. 1908. Camp-Fires on Desert and Lava. New York: Scribner. 366 pp.

Hartzog jr, G.B. 1988. Battling for the National Parks. Introduction by Stewart L. Udall. Mt. Kisco, NY, Moyer Bell Limited. 284 pp.

Hoy, W.E. 1970a. "Organ pipe Cactus National Monument. Historical Research. Administrative." Unpublished manuscript dated October 1970. n.p.

Hoy, W.E. 1970b. "Organ pipe Cactus National Monument. Historical Research. Early Period." Unpublished manuscript dated October 1970. n.p.

Hoy, W.E. 1970c. "Organ pipe Cactus National Monument. Historical Research. Frontier Period." Unpublished manuscript dated October 1970. n.p.

Humphrey, R.R. 1987. Ninety Years and 535 Miles; Changes Along the Mexican Border. Albuquerque, University of New Press. 448 pp.

Ives, R.L. 1955. Mission San Marcelo del Sonoydag. Unpublished manuscript. 12 pp.

Ives, R.L. [ed.] 1967. "Retracing the Route of the Fages Expedition of 1781. Arizona and the West 7(1-2).

Johnson, R.R., B.T. Brown and S. Goldwasser. 1983. Avian use of Quitobaquito Springs Oasis, Organ Pipe Cactus NM, Arizona. Tucson: National Park Service; Cooperative National Park Resources Studies Unit (CPSU) at University of Arizona, CPSU Tech. Rpt. 13. 16 pp.

Lowe, C.H. 1961. Letter in resource management files, Organ Pipe Cactus National Monument.

Lowe, C.H. 1983. Interview, recalling the events of 1961, 1969.

Lumholtz, C. 1912. *New Trails in Mexico: An Account of One Year's Exploration in North-Western Sonora, Mexico, and South-Western Arizona, 1909-1910.* New York: Scribner. 411 pp.

McGee, W.J. 1898. "Papagueria." *National Geographic Magazine* 9:345-371.

Manje, Captain Juan Mateo. 1954. *Unknown Arizona and Sonora, 1693 - 1721, from the Francisco Fernandez del Castillo version of *Luz De Tierra Incognita*.* Karns, Harry J. and Associates [trans.]. Tucson, Arizona, Arizona Silhouettes. 396 pp.

Minckley, W.L. 1973. *Fishes of Arizona.* Phoenix, AZ, Arizona Game and Fish Department. xv + 293p.

Miller, R.R. 1961. Man and the changing fish fauna of the American Southwest. *Papers of the Michigan Academy of Science and Arts* 46:365-404.

Miller, R.R. and L.A. Fuiman. 1987. Description and conservation status of *Cyprinodon macularius eremus*, a new subspecies of pupfish from Organ Pipe Cactus National Monument, Arizona. *Copeia* (3):593-609.

National Park Service. 1941. *Southwestern Monuments Monthly Reports.* November, 1941.

Peters, T. 1979. Interview at commencement of the CPSU/UA Quitobaquito project.

Polzer, C., S.J. 1974. *A Kino Guide: A Life of Eusebio Francisco Kino, Arizona's First Pioneer and A Guide to His Missions and Monuments.* Tucson: Southwestern Mission Research Center. 42 pp.

Rogers, E.B. [comp.] 1958. *History of Legislation Relating to the National Park System Through the 82d Congress; "Organ Pipe Cactus National Monument."* Washington: National Park Service.

Smith, F.J., J.L. Kessell and F.J. Fox. 1966. *Father Kino in Arizona.* Phoenix, Arizona, Arizona Historical Society Foundation. 142 pp.

Steenbergh, W.F. 1969. A report on recent ecological problems at Quitobaquito Springs, Organ Pipe Cactus National Monument, Arizona. Report at ORPI. 8 pp.

Steenbergh, W.F. 1983. Interview, recollecting the events of 1961, 1969.

Teague, G. Personal communication, 3/1/1983.

U.S. House of Representatives. 1856. "Lieutenant Michler's Report" In: United States and Mexican Boundary Survey; Report of William H. Emory, Major, First Cavalry and U.S. Commissioner, 1:74-80.

U.S. Senate. 1898. Report of the Boundary Commission Upon the Survey and Re-marking of the Boundary Between the United States and Mexico West of the Rio Grande, 1891, to 1896. Parts I and II. Part I: "Report of the International Commission." 55th Congress, 2d Session, S. Doc. 247. 456 pp.

Velasco, F. 1861. Sonora: A Description of the Province. William F. Nye, trans. and ed. San Francisco: H.H. Bancroft. 154 pp.

Warren, P.L. and L.S. Anderson. 1987. Recent vegetation change near Quitobaquito Springs, Organ Pipe Cactus National Monument. Tucson: National Park Service; Cooperative National Park Resources Studies Unit (CPSU) at University of Arizona, CPSU/UA Technical Report 20. 40 pp.

Wyllis, R.K. 1940. "Henry A. Crabb--A Tragedy of the Sonora Frontier." Pacific Historical Review 9:183-194.

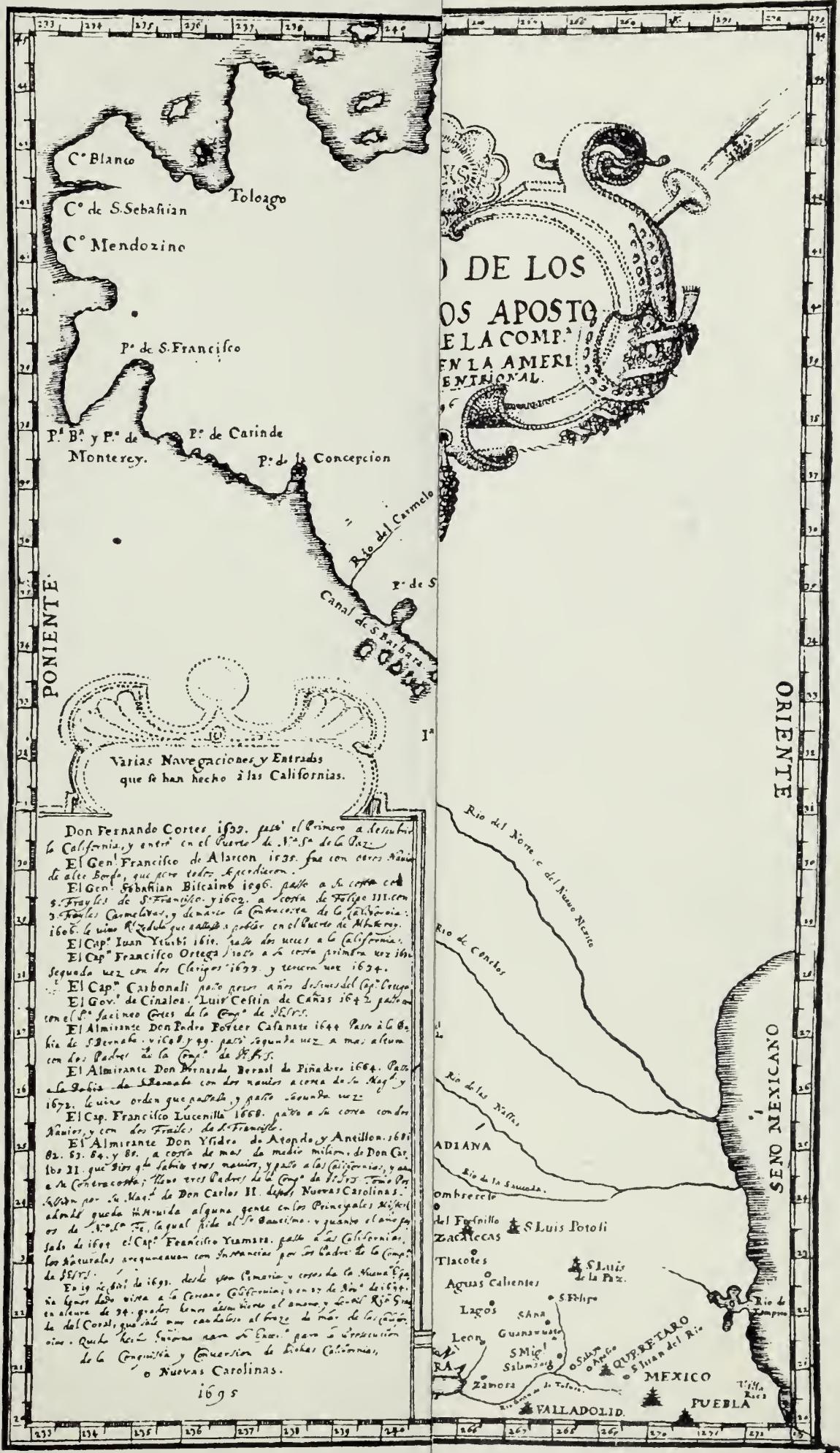
## APPENDIX

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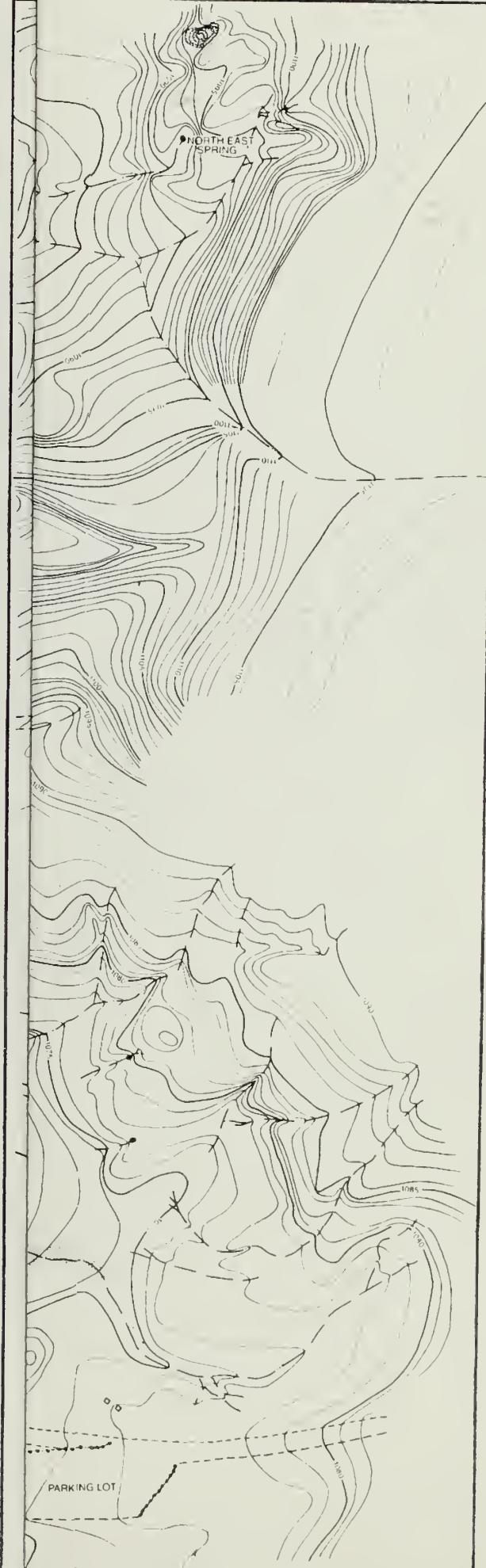
#### ORGAN PIPE CACTUS NATIONAL MONUMENT

1939 to present

William R. Supernaugh (Custodian)	10/03/39 08/20/42
Bates E. Wilson (Custodian)	05/01/42 07/07/43
William R. Supernaugh (Supt. 1950)	07/08/43 07/30/54
James M. Eden	08/22/54 04/22/59
Monte E. Fitch	06/28/59 03/03/62
Paul Judge	04/03/62 09/00/62
James B. Felton	10/26/62 05/07/65
Foy L. Young	05/23/65 09/22/68
Matt H. Ryan	09/22/68 12/07/72
Edward C. Rodriguez, Jr.	01/07/73 08/05/75
Ray G. Martinez, Jr.	10/12/75 09/08/79
W. Franklin Wallace	04/02/80 10/03/81
Harold J. Smith	01/01/82 present









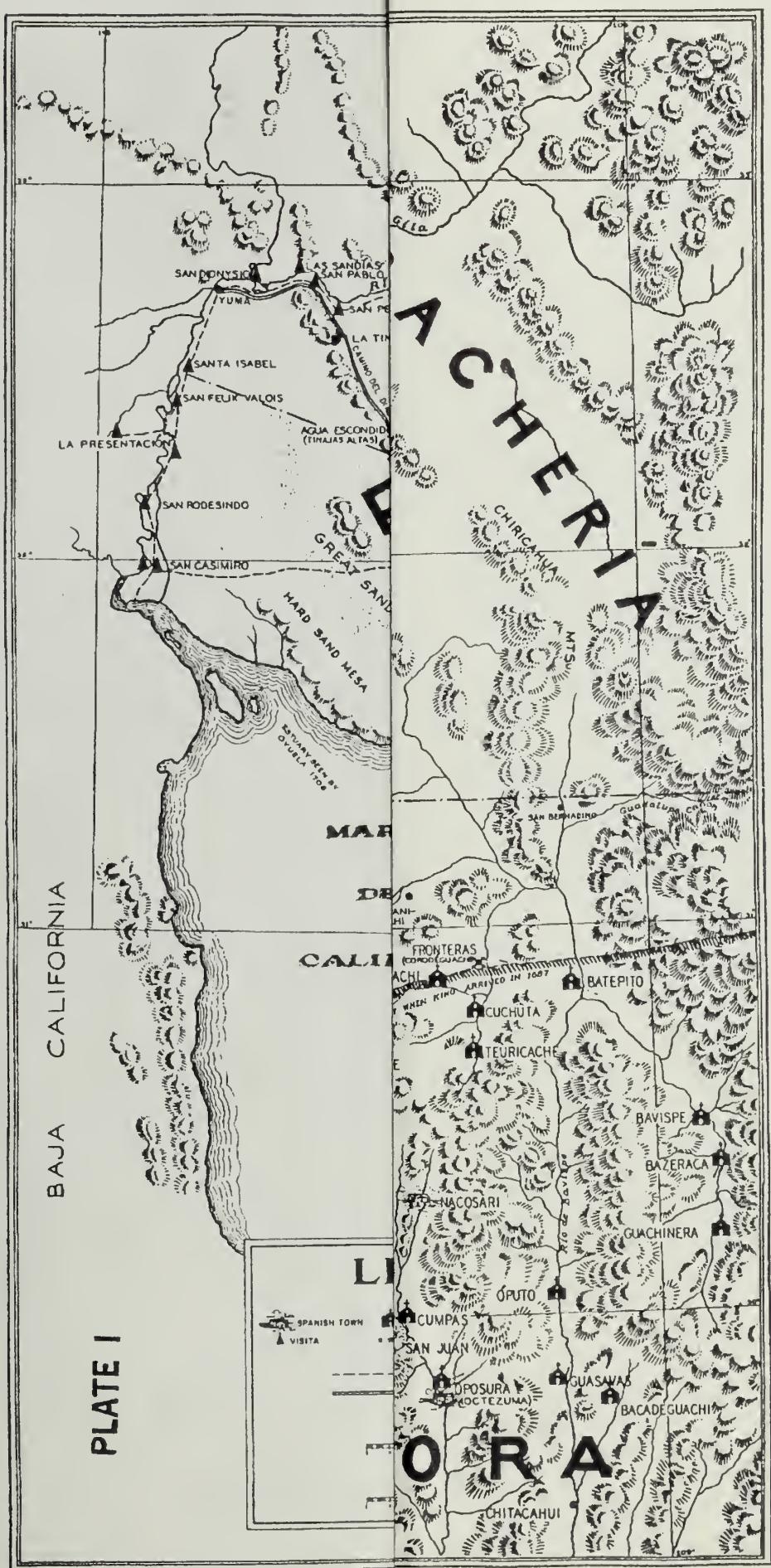


PLATE I

BAJA CALIFORNIA

